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STUDIES OF TRACE ELEMENTS IN SOILS AND PLANTS FROM THE FOUR CORNERS AREA OF NEW MEXICO

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Nevada University

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Studies of Trace Elements in Soils and Plants from the Four Corners Area of New Mexico

By
N.B. Stark
P.F. Harris

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Studies of Trace Elements in Soils and Plants From The Four Corners Area of New Mexico

by

Nellie B. Stark

and

Patricia F. Harris

Final Report To The

U.S. Environmental Protection Agency

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University of Nevada System
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FOREWORD

This report represents the results of an effort to provide the U.S. Environmental Protection Agency with data pertinent to the operation and effects of coal-fired generating plants in the Four Corners area of New Mexico. The study was performed under the auspices of the Center for Water Resources Research of the Desert Research Institute, University of Nevada System. The collection of plant and soil samples was accomplished by Dr. Nellie Stark of the Laboratory of Atmospheric Physics of the Desert Research Institute. She also was responsible for carrying out the plant digestions and soil extractions. The analytical work was carried out under the direction of Mrs. Patricia Harris in the laboratories of the Center for Water Resources Research. Selection of the control and impact areas at Four Corners was made by the project officers, Dr. Gordon Everett and Dr. David Shearer, both of the Environmental Protection Agency. The total project was carried out between April 6 and June 30. 1972.

Gilbert F. Cochran
Acting Director

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INTRODUCTION

This study was initiated following discussions with Dr. Gordon Everett of the Office of Technical Analysis, Environmental Protection Agency and his consultants about the need to develop background and preliminary data on the environmental effects of coal-fired power plants. The objective of the study was to measure the concentration of eleven trace elements in plants and soils in the Four Corners area of New Mexico (see Fig. 1, 2, and 3). Selection of the elements was made by the project officers, Dr. Gordon Everett and Dr. David Shearer, on the basis of data they had obtained from the U.S. Geological Survey on the chemical make-up of the fly ash emitted by the power plants in this location. These eleven elements are: As, Be, Cd, Cr, F, Pb, Mn, Hg, Mo, Ni, Se. Some of the elements studied, such as mercury, lead and selenium, are known to be toxic to animals in relatively low concentrations. This study, by sampling plants and soils in two different locations, attempted to develop preliminary data on the potential buildup of each trace element.

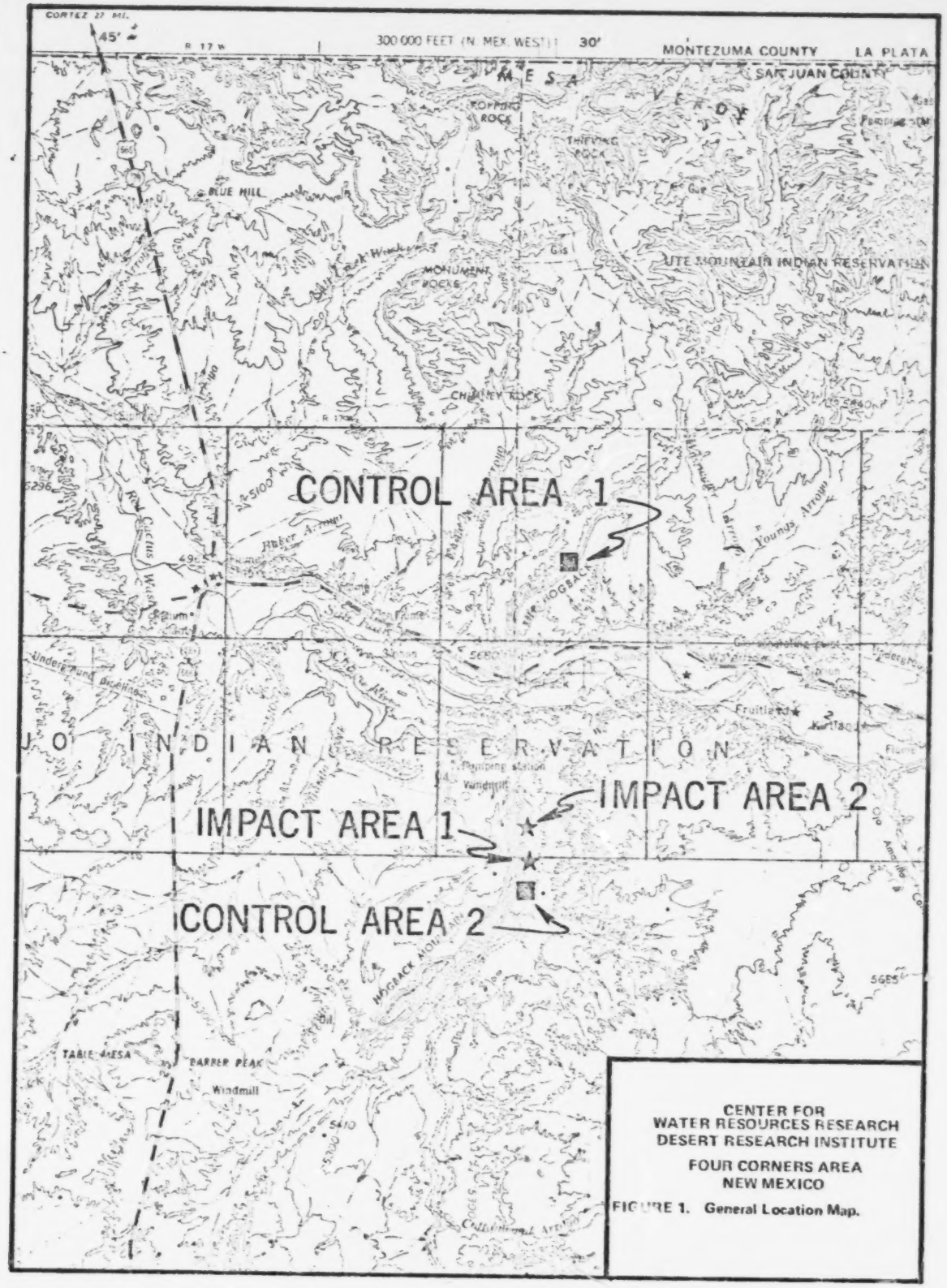
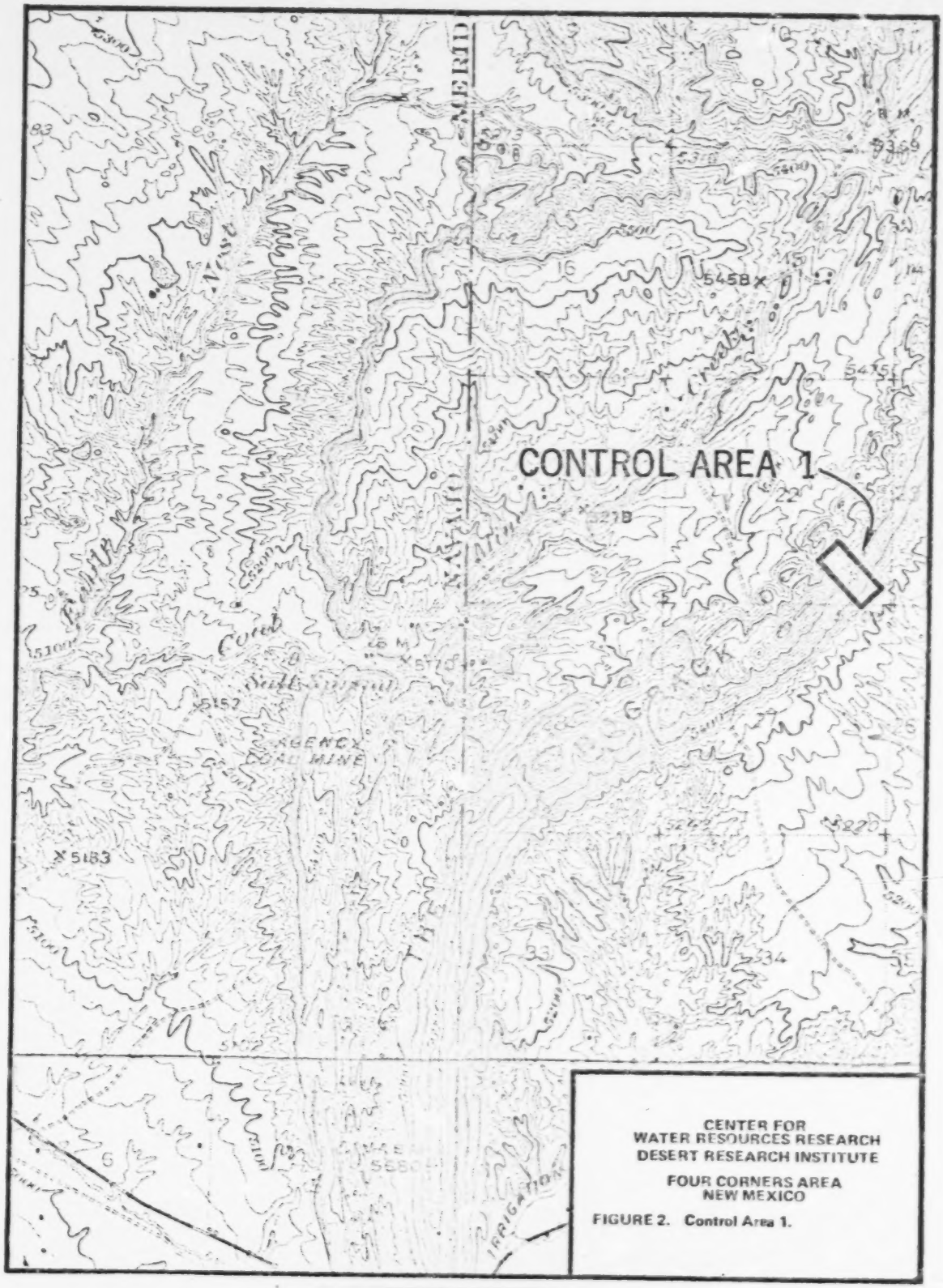


FIGURE 1. General Location Map.



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FOUR CORNERS AREA
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FIGURE 2. Control Area 1.

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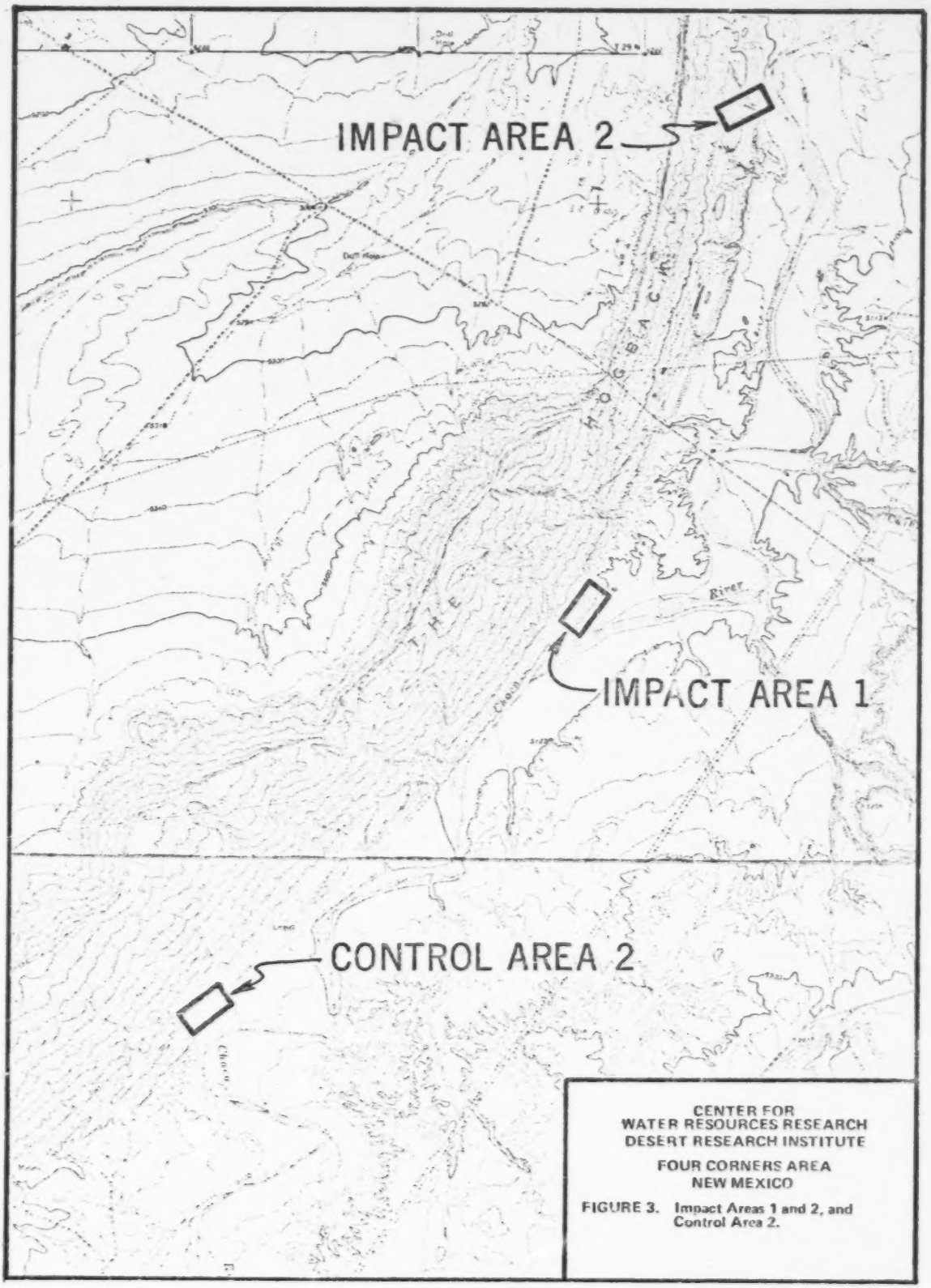

FIGURE 3. Impact Areas 1 and 2, and Control Area 2.

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METHODS

At the request of the project officers, a preliminary survey of "impact" and "control" areas to the west of the Four Corners Plant was made. Initial samples were collected by Dr. Stark on March 12-15, 1972, from the impact and control areas which were selected by Kirkland L. Jones, consultant to the Environmental Protection Agency Office of Technical Analysis. The impact and control areas are depicted respectively in Figures 4 and 5.

The control area is 5 to 6 miles north of the plant on a ridge with Juniper, Ephedra, Atriplex confertifolia, and Chrysothamnus sp. The impact area is about four miles south of the plant on a ridge with slightly different soils and vegetation (Chrysothamnus sp. and Atriplex c.).

The preliminary plant and soil samples were analyzed for ten elements and these data were used to plan the more extensive sampling program. These preliminary samples were surveyed only. The determinations were made for ten of the proposed elements; selenium and mercury were deleted due to insufficient time and an additional determination was made for cobalt. These samples were also used to attempt to optimize analytical procedures to handle the major sample collection and analyses:

1. Different sample weights were used to determine the best weight in terms of analytical accuracy and logistics.
2. 1 N NH_4OAc, 0.002 N H_2SO_4, 1 N HCl and total digestion with HF and $HCLO_4$ acid were used to find the best extractant for soils and plants.

Fig. 4 Control area north of the Four Corners' Plant used in the Preliminary Study. Area is high in gypsum.

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Fig. 5 Impact area south of the Four Corners' Plant used in the Preliminary Study. Much cemented sandstone and very little gypsum here.

Examination of these preliminary data suggested that areas of concentration, such as within a drainage, rather than ridges would be better suited to the objectives of the study in terms of sample collection sites.

On April 6-9, 1972 the main set of samples were collected from a new impact area about 1.5 miles west-southwest of the Four Corners Plant and from a new control area about 8 miles southwest of the plant. These new sampling areas were selected by the Environmental Protection Agency project officers. Both areas are in drainages with sizeable upslope watershed, similar geology and moderately high alkaline soils.

Three study sites were selected along transects established in both the control and impact areas. The following samples were collected from the three sampling sites in both areas:

1. Three (3) soil samples from land surface and three (3) soil samples from a depth of 10 cm. from sample points 1 and 2. At sites 1, 2, and 3 along each transect one (1) surface soil sample and one (1) sample from a depth of 10 cm. were taken from the bottom of the drainage channel, while one (1) or two (2) surface soil samples and soil samples from a depth of 10 cm. were taken from the banks above the wash. A total of sixteen (16) soil samples were collected along each transect: eight (8) from land surface and eight (8) from a depth of 10 cm. The total number of soil samples collected was thirty-two (32).

2. At points 1, 2 and 3 in both the control and impact areas, leaves, roots and live bark were collected from Atriplex confertifolia (saltbush) and Sarcobatus vermiculatus (greasewood). Leaf

and root samples were collected from Chrysothamnus sp. (rabbitbrush). Whole plants of Lesquerella sp. were also collected. At site three in both areas (the highest in elevation), samples of Artemisia (sagebrush) leaves were collected for comparison along with two species of fruticose lichens and one moss. The plant, leaf, bark and root samples were collected from five (5) plants of the same general size and sex and were composited for each species within each of the three sampling sites along each transect. Bark samples were extremely difficult to collect in quantity because the bark was dead on the upper side of the stems, particularly on Atriplex. All samples were collected with plastic gloves to prevent contamination from hands. These samples are summarized in Table 1.

Table 1

Summary of Plant Samples Collected
in both the Impact Area and Control Area

Site 3	Sage, leaves - (from 5 plants) Saltbush, leaves, bark, roots - (from 5 plants) Greasewood, leaves, bark, roots - (from 5 plants) Rabbitbrush, leaves, roots - (from 5 plants) Lesquerella whole plants - (50 individuals) Lichens (2) moss (1) - from 5 places
Site 2	Saltbush, leaves, bark, roots - (from 5 plants) Greasewood, leaves, bark, roots - (from 5 plants) Rabbitbrush, leaves, roots - (from 5 plants) Lesquerella whole plants - (50 individuals)
Site 1	Salt bush, leaves, bark, roots - (from 5 plants) Greasewood, leaves, bark, roots - (from 5 plants) Rabbitbrush, leaves, roots - (from 5 plants) Lesquerella, whole plants - (50 individuals)

SAMPLE PREPARATION

The soil samples were collected in clean glass jars, labelled, and dried for 60 hours at 70°C ± 3 to avoid loss of the more volatile elements. These samples were sieved through a clean 0.7 mm screen, homogenized and quartered for weighing on waxed paper. All soil extractions were made on 10g, oven dried, sieved samples weighed to the fourth place.

The 0.002 N H_2SO_4 extraction at pH3 approximates what elements should be readily available to acid-producing desert plant roots. The 10g soil samples were transferred from the weighing papers into the centrifuge tubes and 25 ml of 0.002 N H_2SO_4 was added with an automatic pipette. The tubes were shaken for 8 minutes in an Eberbach shaker, and centrifuged at 2,400 X g for 8 minutes. The supernatant was poured into a funnel with filter paper and directed into a 100 ml volumetric flask. The soil samples were shaken three more times with 25 ml of 0.002 N H_2SO_4 and centrifuged each time. The supernatant was poured into the funnels and filtered each time and brought to exactly 100 ml volume at room temperature after the fourth extraction. All 32 samples were extracted in duplicate for the 0.002 N H_2SO_4 extraction, and the extractant stored in labelled glass bottles.

A second set of duplicate 10g soil samples was extracted with 1 N HCl. This extraction approximated removal of all elements which are readily soluble in strong acid, and provides an indication of what elements might be available to plant roots over a long period of acid action by roots. The dry 10g soil samples were transferred from the weighing papers into centrifuge tubes and 25 ml of 1 N HCl was added. Because of the strong reaction between the 1 N HCl and the alkali of the soil, these samples were not shaken but were stirred

for 8 minutes. When the majority of the gas had dissipated, the samples were centrifuged at 2400 Xg for 8 minutes, and the supernatant was filtered in the same manner as with the 0.002 N H_2SO_4 extractions. A total of four 25 ml extractions with 8 minute stirring and 8 minutes centrifuging cycles (each time) was run and the extractant brought to 100 ml volume in a volumetric flask at room temperature with the extractant. The soil extractants were made in duplicate and were stored in labelled 100 ml glass bottles for analysis.

The plant samples were examined for aphids, galls, and other insects before drying at 70°C ± 3. The dried samples were ground to pass a 1mm mesh in a clean analytical grinder.

The dried samples were stored in plastic containers and quartered on wax paper for weighing. Each digestion used 2g of dried, ground material transferred from a weighing paper to a 125 ml Erlenmeyer flask, except in cases where only 1 g or 0.5 g were available. A 2g sample was used to supply enough material for actual measurement. Such a large sample of desert plant tissue is hard to get into solution and may cause salt interference during measurement.

All samples were digested in duplicate except as noted. Seven ml of concentrated HNO_3 was added to each sample for predigestion on a hot plate at 180°C. After the cessation of fuming (about 1 hour), 15 ml of concentrated tri-acid (100 ml HNO_3, 10 ml H_2SO_4, 40 ml $HClO_4$) was added and the temperature raised to 260°C ± 5 to complete the digestion (6-8 hours). The salts and acid residue (about 1-2 ml) were taken up in 10 ml of 6 N HCL plus 60 ml distilled water, heated until the salts went into solution, filtered into 100 ml volumetric flasks, and made to 100 ml volume at room temperature.

The digested samples were stored in clean, labelled 100 ml glass bottles.

All reagents were prepared in advance in large quantitites so that the same lot was used for all plant or soil treatments and for the matrix standards and blanks. The glassware was acid cleaned with 6 N HCL, followed by 10 washings with distilled water, and three rinsings with distilled-deionized (5 megohm) water.

The data reported in columns 1 and 2 under solution concentration are duplicate digestions or extractions, not separate measurements of a single digestion or extraction. The variability between duplicates may be related to problems of tube breakage or fringe cooling during the extraction or digestion. Samples exhibiting problems during digestion or extraction are noted with an x, although the data may still be valid. The main problem during soil extractions was centrifuge tube breakage; these samples were re-run. Slow or poor digestion and poor solution were the main problems with the plant tissues, and other samples were run where there was enough tissue.

The digestion of plant material at 260°C $\pm$ 5 is a cool digestion to reduce the loss of selenium and other easily volatilized elements. This temperature created some problem with completing the digestions properly. The normal temperature of 280°C is probably better if selenium is not of particular interest.

Special Considerations

For the 0.002N H_2SO_4 soil extractions, most arsenic, cadmium, lead, molybdenum and nickel levels were not detectable. The 1 N HCL treatment for the soils produced measurements for most elements except molybdenum and

selenium. For the plants, much of the data for arsenic, beryllium, cadmium, lead, molybdenum, and selenium are also below the detection limit. The fluoride data for the plants was not valid.

For both the plants and soils, all data reported as less than (<) indicate values below the detection limit for the analysis method employed. In the plant data, the same material was analyzed using two gram and one gram samples in cases where small amounts were available. If the µg/ml detection limit in solution is 0.02 for both 1g and 2g samples of the same material, the 2g sample, by calculation, gives 1.0 µg/g while the 1g sample gives 2.0 µg/g, when it is not possible to actually measure the amounts.

It was possible that the 2g samples could exhibit either a salting out effect on the trace elements or give significantly higher backgrounds over the 1g samples, resulting in anomalous data for the different sample weights. In order to check this, additional digestions of the moss and lichen samples were performed, and the following analyses were run by atomic absorption.

Sample	Wt.	Be	Cd	Cr	Pb	Mn	Ni
Lichen Gn C-3	0.5	<0.0025	<0.0025	0.044	<0.1	0.25	<0.01
Lichen Gn I-1	0.5	<0.0025		0.017		0.25	<0.01
Moss C-	1	0.0078		0.115		2.97	0.076
Moss C	0.5	0.0051		0.066		1.30	0.025
Moss I	1	0.0117		0.124		2.67	0.080
Moss I	0.5	0.0025		0.052		1.20	0.025
Orange Lichen I	1	0.0043		0.053		0.84	0.031
Orange Lichen I	2	0.0095	0.0043	0.133		2.32	0.058

These data would indicate that the above-mentioned problems are not of great significance where measurable quantities of the elements were encountered.

Unfortunately, for those samples where elements were found only at detection limit levels, an investigation of salting-out and differences in background was not definitive. It should be emphasized, that trace element analyses carried out near the detection limit in complex matrices are subject to decreased accuracy and precision.

The newly available commercial flameless atomic absorption units utilizing carbon rod furnaces or heated metal strips are capable of giving measurements several orders of magnitude lower than those obtained by standard flame atomic absorption. Several types reportedly accommodate properly prepared solid soil and plant samples, thus, circumventing many problems encountered in wet chemical digestions and extractions. This technique is apparently useful for analyzing low levels of some elements such as cadmium, lead, selenium and nickel. The methodology for this flameless AA approach has not as yet been thoroughly assessed. A brief survey of the above plant digestions was attempted using the IL Tantalum Trip Flameless System on a Techtron AA-5. This system gave inconclusive results; but there was insufficient time to establish optimum instrumental operating parameters for each element in these complex matrices. A dual approach of analyzing soil and plant samples by both flame and flameless techniques might be a fruitful effort for future investigation.

New Mexico Samples

Sample Code

Soils

S = Soils

C = Control (different locations for preliminary and final samples)

I = Impact (different locations for preliminary and final samples)

1, 2, 3 Sites 1, 2, 3 in Control or Impact Area

(1, 2) replicates 1, 2

0 = 0-5 cm depth

10 = 10-15 cm depth

Plants

P = Plant

C = Control

I = Impact

1-72 = Sample No.

1,2 ,3 = Sites 1, 2, 3 of C or I

Lvs = Leaves

Bk = Bark

Rts = Roots

Lic = Lichen

M = Whole Plant, Moss

G = Greasewood (Sarcobatus vermiculatus)

A = Saltbush (Atriplex confertifolia)

C = rabbitbrush (Chrysothamnus sp.)

W = Weed (unident.)

S = Sage (*Artemisia* sp)

SDS = Sand dropseed

J = Juniper

E = Ephedra

Gs = Grass

L = *Lesquerella*

Ast = *Astragalus*

Gy = Gray lichen

Gn = Green lichen

O = Orange lichen

Plant = Whole plant (washed roots only + leaves, stems, flowers)

A dash in the tables indicates that no data are available.

Location of Soils and pH

Sample No.	Transect C or I	Site	Location	Depth cm.	pH
1	C	1	Slope	0-5	8.1
2	C	1	Slope	10-15	8.4
3	C	1	Slope	0-5	8.2
4	C	1	Slope	10-15	8.5
5	C	1	Wash	0-5	8.3
6	C	1	Wash	10-15	9.0
7	C	2	Slope	0-5	7.9
8	C	2	Slope	10-15	8.5
9	C	2	Slope	0-5	8.0
10	C	2	Slope	10-15	8.2
11	C	3	Wash	0-5	8.5
12	C	3	Wash	10-15	8.75

13	C	3	Slope	0-5	8.2
14	C	3	Slope	10-15	8.55
15	C	3	Wash	0-5	8.3
16	C	3	Wash	10-15	8.45
17	I	1	Slope	0-5	8.35
18	I	1	Slope	10-15	9.0
19	I	1	Slope	0-5	9.2
20	I	1	Slope	10-15	8.8
21	I	1	Wash	0-5	8.2
22	I	1	Wash	10-15	8.3
23	I	2	Slope	0-5	8.35
24	I	2	Slope	10-15	8.65
25	I	2	Wash	0-5	8.32
26	I	2	Wash	10-15	8.0
27	I	3	Slope	0-5	8.1
28	I	3	Slope	10-15	8.45
29	I	3	Slope	0-5	8.2
30	I	3	Slope	10-15	8.55
31	I	3	Wash	0-5	8.18
32	I	3	Wash	10-15	8.5

x = sample with some problem during digestion or extraction.

pH determined from 1g (± 0.1 g) of oven dried soil sample mixed with 1.0 ml of triple distilled water, allowed to equilibrate for 5 minutes - pH measured on a Beckman "Expandomatic" pH meter.

Code

Blank 9 covers samples 1-8 (including 4(2))

Blank 28 covers samples 10-27

Blank 45 covers samples 29-44

Blank 55 covers samples 46-54

Blank 73 covers samples 56-72

ANALYTICAL METHODS - PRELIMINARY SAMPLES

The preliminary soil extractions and plant digestions on samples collected from the Four Corners area were analyzed for Be, Cd, Co, Cr, Pb, Mn, Mo and Ni by standard atomic absorption techniques using reagent or acid standards with no scale expansion, extractions, or background correction with a hydrogen continuum lamp. Fluoride was determined with a specific ion electrode using acid or reagent standards in conjunction with a total ionic strength acid buffer (TISAB) according to accepted procedures . In addition, a sodium carbonate fusion technique was attempted to obtain total fluoride values for soil samples.

The total soil digestions using HF would have been contaminated with fluoride, therefore, the carbonate fusion technique was investigated. This procedure proved to be very time consuming and yielded uncertain results.

The primary purpose of the preliminary data was to determine the most appropriate methods of sample treatment and analysis and general concentration ranges. Because of the limited time allowed, mercury and selenium were not determined.

ANALYTICAL METHODS - MAIN SAMPLES

Whenever possible, standard methods and procedures were employed to obtain the reported data. All glassware was washed with 1:1 hydrochloric or nitric acid and thoroughly rinsed with distilled-deionized water. The approximate major matrices for the two soil extractions and plant digestions were determined for Na, Ca, Mg and all matrix standards were made up with acid concentrations duplicating those in the respective set of samples. In addition reagent blanks used in the extractions and digestions were analyzed for possible contamination. The acid or reagent blanks showed no contamination above the detection limits for the elements of interest.

In order to obtain the minimum detection limit for each element analyzed by atomic absorption, scale expansion was employed on the Techtron AA-5 Atomic Absorption Spectrophotometer using a 10 inch recorder. For the analyses run by methods other than atomic absorption techniques, sample aliquots were chosen so that a maximum volume could be used within the limitations of the 200 ml total sample volume. Separate soil and plant digestions were used for the flameless AA mercury analysis (Appendix 3). The duplicate analyses represent analyses on two separate digestions of the sample, not a replicate analysis of the same digestion. In the 1.0 N HCl soil extractions there are several sets of confirmed but anamolous data on chromium and nickel which can probably be attributed to sample differences, they are indicated by an asterisk (*). All duplicates were averaged following the convention of half or above rounded to the high value. Where one of the duplicates was indicated as less than the detection limit and the other was indicated as a real concentration, the latter was reported in the average column. All data that were not measurable were reported as less than the

detection limit in solution as µg/ml (e.g., <0.0025 µg/ml for Be). The final sample concentrations were calculated as follows:

$$\frac{\text{µg/ml in solution x 100ml of solution}}{\text{sample wt. in g}} = \text{µg/g sample}$$

It should be noted that the detection limit in the sample varies inversely with the original sample weight and differing sample weights in the plants, by calculation, give different detection limits. In addition, it should be recognized that the accuracy and precision of analyses are decreased with high total solids and that the error of measurement at levels just above the detection limit is apt to be high.

Salt-Acid Matrices

	Na	Ca	Mg	Acid
0.002 N H_2SO_4 Soil	200 µg/ml	200 µg/ml	5 µg/ml	0.002 N H_2SO_4
1.0 N HCl Soil	500 µg/ml	1400 µg/ml	350 µg/ml	1.0 N HCl
Plants	800 µg/ml	100 µg/ml	75 µg/ml	0.6 N HCl

The matrix for these elements was determined by atomic absorption measurements by scanning dilutions of the samples. The matrix in the standards represents an average range for each type of sample.

METHODS OUTLINE - MAIN SAMPLES

Element	I 0.002 N H_2SO_4	II 1.0 N HCl	III Plants
Arsenic	Standard Method Colorimetric SDDC; B & L "Spectronic 20" 1	Same as I	Same as I
	detection limit 0.02 µg/ml	0.02 µg/ml	0.02 µg/ml
Beryllium	Standard AA operating procedure; run against salt-acid matrix standards with appropriate background corrections made using a H_2 continuum lamp; N_2O-Acetylene Flame; 10x scale expansion 2,3	Same as I	Same as I
	detection limit 0.0025 µg/ml	0.0025 µg/ml	0.0025 µg/ml
Cadmium	Standard AA operating procedures; APDC-MIBK extraction of both samples and matrix standards employed to separate from matrix and acid; air-acelylene flame; 0 scale expansion 2, 3, 4, 5 Appendix 1	Standard AA Operating procedures; run against salt-acid matrix standards with appropriate background corrections made using a H_2 continuum lamp; air-acelylene flame; 10x scale expansion.	Same as II
	detection limit 0.005 µg/ml	0.005 µg/ml	0.0025 µg/ml

Chromium	Standard AA operating procedures; run against salt-acid matrix standards with appropriate background corrections using a H_2 continuum lamp; air-acetylene flame 10x scale expansion 2, 3, 4, 5	Same as I	Same as I
	detection limit 0.01 µg/ml	0.01 µg/ml	0.01 µg/ml
Fluoride	Orion specific ion electrode; Beckman "Expandomatic" pH meter; salt-acid matrix standards; pH adjustment and TISAB buffer. 6, 7, 8	Same as I	Orion specific ion Electrode; Beckman "Expandomatic" pH meter; salt-acid matrix standards not valid for samples; standard additions with pH adjustment and TISAB buffer attempted. Presence of organic material would seem to invalidate the data obtained. 6, 7, 8 Appendix 2
	detection limit 0.05 µg/ml	0.05 µg/ml	
Lead	Standard AA operating procedures; APDC-MIBK extraction of both samples and matrix standards employed to separate from the matrix and acid; air acelylene flame; 0 scale expansion 2, 3, 4, 5 Appendix 1	Standard AA operating procedures; run against salt-acid matrix standards with appropriate background corrections made using a H_2 continuum lamp; 10x scale expansion	Same as II
	detection limit 0.05 µg/ml	0.1 µg/ml	0.1 µg/ml
Manganese	Standard AA operating procedures; run against salt-acid matrix standards with appropriate background corrections made using H_2 continuum lamp; 10x scale expansion 2, 3, 4, 5	Same as I 0 scale expansion	Same as I 0 scale expansion
	Detection limit 0.01 µg/ml	0.1 µg/ml	0.1 µg/ml

Mercury	Flameless AA according to modified Hatch and Ott procedure. Duplicate soil digestions; 0 scale expansion 9, 10, 11 Appendix detection limit 0.01 µg		Flameless AA according to modified Hatch and Ott procedure. Duplicate plant digestions where adequate sample was available; 0 scale expansion 9, 10, 11 Appendix 3 0.01 µg
Molybdenum	Standard AA operating procedure; APDC-MIBK extraction of both samples and matrix standards employed to separate from matrix and acid; air-acetylene flame; 0 scale expansion 3 Appendix 1 detection limit 0.05 µg/ml	Standard AA operating procedure; run against salt-acid matrix standards with appropriate background corrections using a H_2 continuum lamp; N_2O-acelylene flame 10x scale expansion 0.05 µg/ml	Same as II 0.05 µg/ml
Nickel	Standard operating procedure; run against salt-acid matrix standards with appropriate background corrections using a H_2 continuum lamp; air-acelylene flame; 10x scale expansion 2, 3, 5 detection limit 0.01 µg/ml	Same as I 0.01 µg/ml	Same as I 0.01 µg/ml
Selenium	Fluorometric procedure using DAN as a chelating agent following ion-exchange separation. 12 Appendix 4 detection limit 0.0025 µg/ml	Same as I 0.005 µg/ml	Same as I 0.005 µg/ml

References

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10. Armstrong, F.A.J., "Semi-Automated Determination of Mercury in Fish Tissue", Fisheries Research Board of Canada Freshwater Institute, Winnipeg, Manitoba, Canada, 1971.

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Appendix 1

Atomic Absorption

Standard atomic absorption procedures were employed for the analysis of the majority of elements of interest. Operating conditions of the Techtron AA5 were otpimized for maximum sensitivity for each element using aqueous standards. Then the untreated sample digestions or extractions were aspirated using a full set of freshly prepared salt-acid matrix standards for reference. The accepted technique of bracketing the samples with standards was followed; with average absorbance values for samples and standards plotted. The salt-acid matrix standards help compensate for differing viscosity, surface tension, and other background effects introduced by the high dissolved solids in the extractions and digestions. Both matrix and acid blanks were measured for possible contamination. All data was recorded on a Varian 10 inch linear recorder.

In addition, background measurements were made for each element using the hydrogen continuum lamp. This was a particularly useful procedure for elements whose wavelength of maximum absorption is low, as absorption signals are often due to non-atomic parameters in complex matrices. It was possible to correct for such effects by measuring the background signals using the hydrogen continuum lamp at the wavelength of interest. This signal correction is subtracted from the absorbance value measured with the respective hollow cathode lamp. The difference represents the absorbance due to the element present in solution.

Another procedure used to separate the element of interest from the matrix was the extraction of the ammonium pyrollidine dithiccarbamate (APDC) complex into an organic solvent, in this case methyl iso-butyl ketone (MIBK). This procedure separates the element from the matrix and results in increased sensitivity

due to both concentration and the signal enhancement produced by the organic solvent. The extraction procedure followed was that described in the FWQA manual[4] with the exception that 25ml and 50ml sample volumes were used. The MIBK-APDC extractions were successful with 0.002 N H_2SO_4 soil samples. Unreliable data were obtained with the 1 N HCl samples and the results were discarded; apparently the presence of some organic material in solution produced an interference in the extraction procedure. Trial APDC-MIBK extractions on the plant digestions gave unbreakable solvent/sample emulsions and this approach was abandoned. The problem was apparently caused by significant amounts of organic compounds remaining in the plant digestions. The presence of these organics in the plant digestions was confirmed in the fluoride analysis work.

Appendix 2

Flucride

The analysis for fluoride posed unanticipated problems in the plant digestions. Widely divergent amounts of residual digestion acids and organic compounds were present from sample to sample and within the duplicate digestions. Upon neutralization, the odor of organic amines was quite evident. Unfortunately duplicates of the plant digestions differed completely in electrode response, and it was impossible to correlate the samples to any set of approximate salt-acid matrix standards. Further investigation showed that the interferences could not be eliminated by evaporation to dryness.

It was thought that standard addition technique would be applicable to the plant digestions. Aliquots of the sample were adjusted for pH, total ionic strength acid buffer (TISAB) was added and 0.5, 0.25and 0.0 ppm fluoride standard was added with appropriate volume adjustment. Millivolt readingsof these solutions were taken with the specific ion electrode and plotted against concentration on semi-log paper. Anomalous data resulted, with the spiked samples giving relatively consistent millivolt readings but with the zero additions responses varying widely and inconsistently. An attempt was made to calculate the data. After a comparison with the digestion blanks data was made, it was concluded that the electrode response of the unspiked samples was not due to fluoride ions. The limited sample volume precluded separation of any fluoride from the sample by steam distillation procedures. For the above reasons, it was thought that reporting any numerical data for fluoride on the plant digestions would lead to erroneous conclusions. Perhaps an indepentdent specific plant digestion for fluoride would be a better approach for future work.

References:

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Gyoerkoes, T., D.A. White, and R.L. Luthy, "Determination of F in Vegetation with the F^- Selection Ion Electrode" Journal of Metals, 22, 29A, 1970.

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Appendix 3

Mercury

Because of the high volatility of mercury and its compounds, separate low temperature digestions of the plant and soil samples were executed in duplicate. Following digestion, the samples were measured for mercury using the flameless technique originally described by Hatch and Ott[9] and refined by subsequent authors.[10,11]

1. Procedure for Soil Samples and Plants

The procedure was essentially that outlined in J.R. Melton, W.L. Hoover, and P.A. Howard, Soil Sci. Soc. Amer. Proc., 35, 850 (1971). Total recovery could not be expected unless a recycling system were used. However, a single pass peak height process appears to give satisfactory results (W.L. Hoover, J.R. Melton, and P.A. Howard, J. Assoc. Off. Anal Chem., 54, 860 (1971)).

Each sample and standard was swirled after addition of reductant and stirred with a magnetic stir bar at maximum speed. One minute elapsed between addition of reductant and aeration. Total volume of standards and samples was approximately 80 ml in a 125 ml erlenmeyer flask.

For the soil samples foaming was kept under control during aeration by regulation of the air flow. Foaming was much worse for the plant samples and it was necessary to allow each one to overflow into a trap.

Instruments and Settings - for all analyses:

Beckman AA, with Beckman DB-G Spectrophotometer

Beckman Recorder, 10 inch linear-log recorder

Flowmeter R-2-15-A, Carboloy ball

2. Digestion of Soils

Each sample was placed in an ice bath, 20 ml of 1:1 concentrated HNO_3-H_2SO_4. This was allowed to cool and 10 ml of a saturated aqueous solution of $K_2S_2O_8$ were added. The samples were allowed to stand overnight at room temperature. The standards were subjected to the same treatment except that they were digested only 2-4 hours since the mercury was considered to be in the mercuric form prior to digestion. Spiked samples gave recoveries.

3. Digestion of Plants

The procedure is essentially that given in: F.A.J. Armstrong, "Semi-Automated Determination of Mercury in Fish Tissue", Fisheries Research Board of Canada, Freshwater Institute, 501 University Crescent, Winnipeg 19, Manitoba, Canada.

Samples and standards were placed in an ice bath and 5 ml of 1:4 concentrated HNO_3:H_2SO_4 was added. After cooling, 5 ml of 6% (wt/vol) aqueous $KMnO_4$ was added slowly. The samples fumed violently at this point. After the reaction subsided, another 10 ml of 6% $KMmO_4$ was added. One set of samples was allowed to sit at room temperature for four days; the corresponding standards were treated similarly, but were digested 3-8 hours. The second set of samples and standards were all digested overnight.

Appendix 4

Selenium

The soil extractions and plant digestions were analyzed for selenium using the procedure of P.F. Lott, et. al.[1] as outlined below. This sensitive method is reported to be useful in plant analysis and has been used by this laboratory for determining trace selenium concentrations in water samples.

1. With each set of samples run at least 0 (blank) 0.01, 0.05, 0.075 and 0.10 µg of Se as standards dissolved in appropriate matrices.
2. Place appropriate volume of sample in 50 ml erlenmeyer.

   Note: If the sample is high in interfering cations (Fe etc.) a batch ion exchange procedure is necessary. Wash the resin (Dowex 50 W X 8 100-200 mesh H+form) with distilled water. Adjust the original sample aliquot to pH2 (pH meter) and add to a 50 ml cap erlenmeyer containing approx. 0.25 g of the washed resin (this is about a small spatula-full). Shake the sample on a wrist action shaker for about 2 hrs. Filter the sample through a funnel containing a coned-filter paper into 50 ml beaker, and rinse the resin three times with about 5 ml distilled H_2O. Standards are treated exactly as the samples.
3. Make DAN soln. (0.05 g DAN/50 ml 0.1 N HCL)
4. Add 0.5 ml of NaF (0.1 N) and 0.5 ml of EDTA (0.1 N)
5. Add 5 ml DAN reagent
6. Adjust to pH2 with dilute base and let stand 2 hrs. (use pH meter)
7. Extract with 10 ml toluene by shaking for 30 seconds in 125 ml sep-rotary funnel and letting the phases separate for 2 minutes.

8. Remove aqueous phase and plug stem with a wad of filter paper to remove small water droplets from toluene.
9. Add toluene to cuvettes (wash off with ETOH), set the zero on the blank and take fluorescence readings on a Turner Model 111 Fluorometer.
10. Plot standards vs. fluorescence and read concentration of samples from curve.

Analytical Problems with Selenium

The reproducability for plant and HCl soil samples was not good. The HCl soil samples gave rise to a yellowish toluene solution and subsequent high (off scale) fluoresence readings. This particular interference seemed to be removed by substituting cyclohexane[2] for toluene as the extraction solvent.

Poor reproducability for the plant samples may have been due to the presence of organic compounds which interfere with the method. It was noticed that several plant samples produced a precipitate when the DAN (2,3 diaminonaphthalene) was added. Precipitation is common when DAN is placed in solution with organic compounds such as aldehydes. Standard addition techniques were attempted on some samples, but proved to be inconclusive. In brief, the selenium data for the plants should be regarded as questionable.

Suggestions for Future Work on Selenium Analysis:

The fluorometric procedure using DAN as complexing agent is undoubtedly the preferred method for low selenium levels.[3] One does have more of a choice in regard to sample preparation. In addition to nitric-perchloric acid

digestions,[4] oxygen-flask combustion techniques[5,6] have led to good results. The most recently developed method for low level analysis is that of Ewan.[7]

References

1. P.F. Lott et. al., Anal. Chem., 35 (9), 1159(1963).

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5. Allaway, W.H. and E.E. Cary., Anal. Chem., 36 (1964) 1359-1362.

6. Johnson, H., Environmental Science and Technology, 4, (1970) 850-853.

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APPENDIX 5

ANALYTICAL DATA

Preliminary Studies
New Mexico
Four Corners

Element: Arsenic — Soils

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml	Soil Concentration µg/g
NH_4OAc				
C-1	SC (1,2) 0	5 g	<0.05	<1.0
C-2	SC (1,2) 10			
C-3	SC (1,2) 0			
C-4	SC (1,2) 10			
I-1	SI (1,2) 0			
I-2	SI (1,2) 10			
I-3	SI (1,2) 0			
I-4	SI (1,2) 10			
1 N HCl				
C-1	SC (1,2) 0	10	<0.05	<0.5
C-2	SC (1,2) 10		0.06	0.6
C-3	SC (1,2) 0		0.06	0.6
C-4	SC (1,2) 10		<0.05	<0.5
I-1	SI (1,2) 0		<0.05	<0.5
I-2	SI (1,2) 10		<0.05	<0.5
I-3	SI (1,2) 0		0.05	0.5
I-4	SI (1,2) 10		0.06	0.6
0.002 N H_2SO_4				
C-1	SC (1,2) 0	10	<0.05	<0.5
C-2	SC (1,2) 10			
C-3	SC (1,2) 0			
C-4	SC (1,2) 10			
I-1	SI (1,2) 0			
I-2	SI (1,2) 10			
I-3	SI (1,2) 0			
I-4	SI (1,2) 10			
HF				
C-1	SC (1,2) 0	1.0	0.06	6.0
C-2	SC (1,2) 10	1.0	0.09	9.0
C-3	SC (1,2) 0	0.5	<0.05	<10.0
C-4	SC (1,2) 10	0.5	<0.05	<10.0
I-1	SI (1,2) 0	1.0	0.06	6.0
I-2	SI (1,2) 10	1.0	0.06	6.0
I-3	SI (1,2) 0	0.5	<0.05	<10.0
I-4	SI (1,2) 10	0.5	<0.05	<10.0

Preliminary Studies
New Mexico
Four Corners

Element: Beryllium

Soils

Sample No.	Location Code	Sample wt.	Solution Concentration µg/ml	Soil Concentration µg/g	pH
NH_4OAc					
C-1*	SC (1,2) 0	5 g	<0.02	<0.4	8.40
C-2	SC (1,2) 10				8.13
C-3	SC (1,2) 0				7.89
C-4	SC (1,2) 10				8.03
I-1	SI (1,2) 0				8.30
I-2	SI (1,2) 10				8.35
I-3	SI (1,2) 0				8.52
I-4	SI (1,2) 10				8.88
1 N HCl					
C-1	SC (1,2) 0	10 g	<0.02	<0.2	
C-2	SC (1,2) 10				
C-3	SC (1,2) 0				
C-4	SC (1,2) 10				
I-1	SI (1,2) 0				
I-2	SI (1,2) 10				
I-3	SI (1,2) 0				
I-4	SI (1,2) 10				
0.002N H_2SO_4					
C-1	SC (1,2) 0	10 g	<0.02	<0.2	
C-2	SC (1,2) 10				
C-3	SC (1,2) 0				
C-4	SC (1,2) 10				
I-1	SI (1,2) 0				
I-2	SI (1,2) 10				
I-3	SI (1,2) 0				
I-4	SI (1,2) 10				
HF					
C-1	SC (1,2) 0	1.0 g	<0.02	<2.0	
C-2	SC (1,2) 10	1.0 g		<2.0	
C-3	SC (1,2) 0	0.5 g		<4.0	
C-4	SC (1,2) 10	0.5 g		<4.0	
I-1	SI (1,2) 0	1.0 g		<2.0	
I-2	SI (1,2) 10	1.0 g		<2.0	
I-3	SI (1,2) 0	0.5 g		<4.0	
I-4	SI (1,2) 10	0.5 g		<4.0	

* All soil samples in this series are from the slopes.

Preliminary Studies
New Mexico
Four Corners

Element: Cadmium

Soils

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml	Soil Concentration µg/g
NH_4OAc				
C-1	SC (1,2) 0	5 g	<0.01	<0.2
C-2	SC (1,2) 10	↓	↓	↓
C-3	SC (1,2) 0			
C-4	SC (1,2) 10			
I-1	SI (1,2) 0			
I-2	SI (1,2) 10			
I-3	SI (1,2) 0			
I-4	SI (1,2) 10	↓	↓	↓
1 N HCl				
C-1	SC (1,2) 0	10 g	0.025	0.25
C-2	SC (1,2) 10	↓	0.020	0.20
C-3	SC (1,2) 0		0.014	0.14
C-4	SC (1,2) 10		<0.01	<0.1
I-1	SI (1,2) 0		0.02	0.2
I-2	SI (1,2) 10		0.02	0.2
I-3	SI (1,2) 0		0.02	0.2
I-4	SI (1,2) 10	↓	0.027	0.27
0.002 N H_2SO_4				
C-1	SC (1,2) 0	10 g	<0.01	<0.1
C-2	SC (1,2) 10	↓	↓	↓
C-3	SC (1,2) 0			
C-4	SC (1,2) 10			
I-1	SI (1,2) 0			
I-2	SI (1,2) 10			
I-3	SI (1,2) 0			
I-4	SI (1,2) 10	↓	↓	↓
HF				
C-1	SC (1,2) 0	1.0 g	<0.01	<1.0
C-2	SC (1,2) 10	1.0 g	<0.01	<1.0
C-3	SC (1,2) 0	0.5 g	<0.01	<2.0
C-4	SC (1,2) 10	0.5 g	<0.01	<2.0
I-1	SI (1,2) 0	1.0 g	<0.01	<1.0
I-2	SI (1,2) 10	1.0 g	<0.01	<1.0
I-3	SI (1,2) 0	0.5 g	<0.01	<2.0
I-4	SI (1,2) 10	0.5 g	<0.01	<2.0

Preliminary Studies
New Mexico
Four Corners

Element: Chromium — Soils

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml	Soil Concentration µg/g
NH_4OAc				
C-1	SC (1,2) 0	5 g	<0.05	<1.0
C-2	SC (1,2) 10	↓	↓	↓
C-3	SC (1,2) 0			
C-4	SC (1,2) 10			
I-1	SI (1,2) 0			
I-2	SI (1,2) 10			
I-3	SI (1,2) 0			
I-4	SI (1,2) 10			
1 N HCl				
C-1	SC (1,2) 0	10 g	0.20	2.0
C-2	SC (1,2) 10	↓	0.175	1.75
C-3	SC (1,2) 0		0.125	1.25
C-4	SC (1,2) 10		0.125	1.25
I-1	SI (1,2) 0		0.1	1.0
I-2	SI (1,2) 10		0.125	1.25
I-3	SI (1,2) 0		0.1	1.0
I-4	SI (1,2) 10		0.125	1.25
0.002 N H_2SO_4				
C-1	SC (1,2) 0	10 g	<0.05	<0.5
C-2	SC (1,2) 10	↓	↓	↓
C-3	SC (1,2) 0			
C-4	SC (1,2) 10			
I-1	SI (1,2) 0			
I-2	SI (1,2) 10			
I-3	SI (1,2) 0			
I-4	SI (1,2) 10			
HF				
C-1	SC (1,2) 0	1.0 g	0.325	32.5
C-2	SC (1,2) 10	1.0 g	0.25	25
C-3	SC (1,2) 0	0.5 g	0.20	40
C-4	SC (1,2) 10	0.5 g	0.15	30
I-1	SI (1,2) 0	1.0 g	0.20	20
I-2	SI (1,2) 10	1.0 g	0.20	20
I-3	SI (1,2) 0	0.5 g	0.125	25
I-4	SI (1,2) 10	0.5 g	0.175	35

Preliminary Studies
New Mexico
Four Corners

Element: Cobalt — Soils

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml	Soil Concentration µg/g
NH_4OAc				
C-1	SC (1,2) 0	5 g	<0.075	<1.5
C-2	SC (1,2) 10	↓	<0.075	<1.5
C-3	SC (1,2) 0	↓	<0.075	<1.5
C-4	SC (1,2) 10	↓	0.12	2.4
I-1	SI (1,2) 0	↓	<0.075	<1.5
I-2	SI (1,2) 10	↓	<0.075	<1.5
I-3	SI (1,2) 0	↓	<0.075	<1.5
I-4	SI (1,2) 10	↓	<0.075	<1.5
1 N HCl				
C-1	SC (1,2) 0	10 g	0.1	1.0
C-2	SC (1,2) 10	↓	0.19	1.9
C-3	SC (1,2) 0	↓	0.25	2.5
C-4	SC (1,2) 10	↓	0.20	2.0
I-1	SI (1,2) 0	↓	0.17	1.7
I-2	SI (1,2) 10	↓	0.19	1.9
I-3	SI (1,2) 0	↓	0.17	1.7
I-4	SI (1,2) 10	↓	0.20	2.0
0.002 N H_2SO_4				
C-1	SC (1,2) 0	10 g	<0.075	<0.75
C-2	SC (1,2) 10	↓	↓	↓
C-3	SC (1,2) 0	↓	↓	↓
C-4	SC (1,2) 10	↓	↓	↓
I-1	SI (1,2) 0	↓	↓	↓
I-2	SI (1,2) 10	↓	↓	↓
I-3	SI (1,2) 0	↓	↓	↓
I-4	SI (1,2) 10	↓	↓	↓
HF				
C-1	SC (1,2) 0	1.0 g	0.13	13
C-2	SC (1,2) 10	1.0 g	0.17	17
C-3	SC (1,2) 0	0.5 g	0.12	24
C-4	SC (1,2) 10	0.5 g	<0.075	<14.5
I-1	SI (1,2) 0	1.0 g	0.1	10
I-2	SI (1,2) I0	1.0 g	0.18	18
I-3	SI (1,2) 0	0.5 g	<0.075	<14.5
I-4	SI (1,2) 10	0.5 g	<0.075	<14.5

Preliminary Studies
New Mexico
Four Corners

Element: Fluoride — Soils

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml	Soil Concentration µg/g
NH_4OAc				
C-1	SC (1,2) 0	5 g	0.076	1.52
C-2	SC (1,2) 10		0.13	2.6
C-3	SC (1,2) 0		0.182	3.64
C-4	SC (1,2) 10		0.25	5.0
I-1	SI (1,2) 0		0.08	1.6
I-2	SI (1,2) 10		0.96	1.92
I-3	SI (1,2) 0		0.062	1.24
I-4	SI (1,2) 10		0.088	1.76
1 N HCl				
C-1	SC (1,2) 0	10 g	12.8	128
C-2	SC (1,2) 10		16.5	165
C-3	SC (1,2) 0		14.0	140
C-4	SC (1,2) 10		16.15	161.5
I-1	SI (1,2) 0		9.4	94
I-2	SI (1,2) 10		10.5	105
I-3	SI (1,2) 0		8.2	82
I-4	SI (1,2) 10		9.9	99
0.002 N H_2SO_4				
C-1	SC (1,2) 0	10 g	0.19	1.9
C-2	SC (1,2) 10		0.152	1.52
C-3	SC (1,2) 0		0.152	1.52
C-4	SC (1,2) 10		0.26	2.6
I-1	SI (1,2) 0		0.15	1.5
I-2	SI (1,2) 10		0.175	1.75
I-3	SI (1,2) 0		0.135	1.35
I-4	SI (1,2) 10		0.18	1.8
Na_2CO_3 fusion				
C-1	SC (1,2) 0	0.25 g	1.0	400
C-2	SC (1,2) 10		0.7	280
C-3	SC (1,2) 0		1.3	520
C-4	SC (1,2) 10		0.42	168
I-1	SI (1,2) 0		0.53	212
I-2	SI (1,2) 10		0.68	272
I-3	SI (1,2) 0		0.55	232
I-4	SI (1,2) 10		0.66	264

Preliminary Studies
New Mexico
Four Corners

Element: Lead — Soils

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml	Soil Concentration µg/g
NH_4OAc				
C-1	SC (1,2) 0	5 g	<0.1	<2.0
C-2	SC (1,2) 10		0.14	2.8
C-3	SC (1,2) 0		0.14	2.8
C-4	SC (1,2) 10		0.26	0.2
I-1	SI (1,2) 0		0.12	2.4
I-2	SI (1,2) 10		0.18	3.2
I-3	SI (1,2) 0		0.14	2.8
I-4	SI (1,2) 10		<0.1	<2.0
1 N HCl				
C-1	SC (1,2) 0	10 g	0.5	5.0
C-2	SC (1,2) 10		0.29	2.9
C-3	SC (1,2) 0		0.58	5.8
C-4	SC (1,2) 10		0.46	4.6
I-1	SI (1,2) 0		0.32	3.2
I-2	SI (1,2) 10		0.32	3.2
I-3	SI (1,2) 0		0.50	5.0
I-4	SI (1,2) 10		0.43	4.3
0.002 N H_2SO_4				
C-1	SC (1,2) 0	10 g	<0.1	<1.0
C-2	SC (1,2) 10			
C-3	SC (1,2) 0			
C-4	SC (1,2) 10			
I-1	SI (1,2) 0			
I-2	SI (1,2) 10			
I-3	SI (1,2) 0			
I-4	SI (1,2) 10			
HF				
C-1	SC (1,2) 0	1.0 g	<0.1	<10
C-2	SC (1,2) 10	1.0 g		<10
C-3	SC (1,2) 0	0.5 g		<20
C-4	SC (1,2) 10	0.5 g		<20
I-1	SI (1,2) 0	1.0 g		<10
I-2	SI (1,2) 10	1.0 g		<10
I-3	SI (1,2) 0	0.5 g		<20
I-4	SI (1,2) 10	0.5 g		<20

Preliminary Studies
New Mexico
Four Corners

Element: Manganese — Soils

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml	Soil Concentration µg/g
NH_4OAc				
C-1	SC (1,2) 0	5 g	0.03	0.6
C-2	SC (1,2) 10		0.03	0.6
C-3	SC (1,2) 0		0.08	1.6
C-4	SC (1,2) 10		0.075	1.5
I-1	SI (1,2) 0		0.13	2.6
I-2	SI (1,2) 10		0.05	1.0
I-3	SI (1,2) 0		0.18	3.6
I-4	SI (1,2) 10		0.05	1.0
1 N HCl				
C-1	SC (1,2) 0	10 g	6.46	64.6
C-2	SC (1,2) 10		0.72	7.2
C-3	SC (1,2) 0		7.76	77.6
C-4	SC (1,2) 10		1.82	18.2
I-1	SI (1,2) 0		9.3	93.0
I-2	SI (1,2) 10		5.65	56.5
I-3	SI (1,2) 0		9.4	94.0
I-4	SI (1,2) 10		5.45	54.5
0.002 N H_2SO_4				
C-1	SC (1,2) 0	10 g	0.06	0.6
C-2	SC (1,2) 10		0.025	<0.25
C-3	SC (1,2) 0		<0.025	<0.25
C-4	SC (1,2) 10		<0.025	<0.25
I-1	SI (1,2) 0		0.04	0.4
I-2	SI (1,2) 10		0.03	0.3
I-3	SI (1,2) 0		<0.025	<0.25
I-4	SI (1,2) 10		<0.025	<0.25
HF				
C-1	SC (1,2) 0	1.0 g	2.88	288
C-2	SC (1,2) 10	1.0 g	1.68	168
C-3	SC (1,2) 0	0.5 g	1.52	304
C-4	SC (1,2) 10	0.5 g	0.41	82
I-1	SI (1,2) 0	1.0 g	2.75	275
I-2	SI (1,2) 10	1.0 g	2.27	227
I-3	SI (1,2) 0	0.5 g	1.31	262
I-4	SI (1,2) 10	0.5 g	1.18	236

Preliminary Studies
New Mexico
Four Corners

Element: Molybdenum

Soils

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml	Soil Concentration µg/g
NH_4OAc				
C-1	SC (1,2) 0	5 g	<0.5	<10
C-2	SC (1,2) 10	↓	↓	↓
C-3	SC (1,2) 0			
C-4	SC (1,2) 10			
I-1	SI (1,2) 0			
I-2	SI (1,2) 10			
I-3	SI (1,2) 0			
I-4	SI (1,2) 10			
1 N HCl				
C-1	SC (1,2) 0	10 g	<0.5	<5.0
C-2	SC (1,2) 10	↓	<0.5	<5.0
C-3	SC (1,2) 0		<0.5	<5.0
C-4	SC (1,2) 10		<0.5	<5.0
I-1	SI (1,2) 0		0.69	6.9
I-2	SI (1,2) 10		<0.5	<5.0
I-3	SI (1,2) 0		<0.5	<5.0
I-4	SI (1,2) 10		<0.5	<5.0
0.002 N H_2SO_4				
C-1	SC (1,2) 0	10 g	<0.5	<5.0
C-2	SC (1,2) 10	↓	↓	↓
C-3	SC (1,2) 0			
C-4	SC (1,2) 10			
I-1	SI (1,2) 0			
I-2	SI (1,2) 10			
I-3	SI (1,2) 0			
I-4	SI (1,2) 10			
HF				
C-1	SC (1,2) 0	1.0 g	2.25	225
C-2	SC (1,2) 10	1.0 g	1.3	130
C-3	SC (1,2) 0	0.5 g	2.25	450
C-4	SC (1,2) 10	0.5 g	1.3	260
I-1	SI (1,2) 0	1.0 g	1.0	100
I-2	SI (1,2) 10	1.0 g	1.9	190
I-3	SI (1,2) 0	0.5 g	<0.5	400
I-4	SI (1,2) 10	0.5 g	1.62	324

Preliminary Studies
New Mexico
Four Corners

Element: Nickel — Soils

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml	Soil Concentration µg/g
NH_4OAc				
C-1	SC (1,2) 0	5 g	<0.05	<1.0
C-2	SC (1,2) 10	↓	↓	↓
C-3	SC (1,2) 0			
C-4	SC (1,2) 10			
I-1	SI (1,2) 0			
I-2	SI (1,2) 10			
I-3	SI (1,2) 0			
I-4	SI (1,2) 10			
1 N HCl				
C-1	SC (1,2) 0	10 g	0.28	2.8
C-2	SC (1,2) 10	↓	0.24	2.4
C-3	SC (1,2) 0		0.24	2.4
C-4	SC (1,2) 10		0.18	1.8
I-1	SI (1,2) 0		0.14	1.4
I-2	SI (1,2) 10		0.26	2.6
I-3	SI (1,2) 0		0.18	1.8
I-4	SI (1,2) 10		0.26	2.6
0.002 N H_2SO_4				
C-1	SC (1,2) 0	10 g	<0.05	<0.5
C-2	SC (1,2) 10	↓	↓	↓
C-3	SC (1,2) 0			
C-4	SC (1,2) 10			
I-1	SI (1,2) 0			
I-2	SI (1,2) 10			
I-3	SI (1,2) 0			
I-4	SI (1,2) 10			
HF				
C-1	SC (1,2) 0	1.0 g	0.24	24
C-2	SC (1,2) 10	1.0 g	0.24	24
C-3	SC (1,2) 0	0.5 g	0.16	32
C-4	SC (1,2) 10	0.5 g	0.12	24
I-1	SI (1,2) 0	1.0 g	0.08	8
I-2	SI (1,2) 10	1.0 g	<0.05	< 5
I-3	SI (1,2) 0	0.5 g	<0.05	<10
I-4	SI (1,3) 10	0.5 g	<0.05	<10

Preliminary Studies
New Mexico
Four Corners

Element: Arsenic — Plants

Sample No.	Location	Code	Sample Wt. g	Solution Concentration µg/ml	Plant Concentration µg/g
PC 1	Stems	E	2.0	<0.05	<2.5
PI 2	Stems	E			
PC 3	Lvs	J			
PI 4		J			
PC 5		C			
PI 6		C			
PC 7		G	1.0		<5.0
PI 8		G	1.0		<5.0
PC 9	Rts	E	2.0	0.09	<2.5
PI 10		E	2.0	<0.05	<2.5
PC 11		C	1.0		<5.0
PI 12		C			<5.0
PC 13	Plant	SDS		0.06	6.0
PI 14	Plant	SDS		<0.05	<5.0
PC 15	Rts	G		<0.05	<5.0
PI 16		G		0.09	9.0
PC 17		J	2.0	<0.05	<2.5

Element: Beryllium

PC 1	Stems	E	2.0	<0.02	<1.0
PI 2	Stems	E			
PC 3	Lvs	J			
PI 4		J			
PC 5		C			
PI 6		C			
PC 7		G	1.0		<2.0
PI 8		G	1.0		<2.0
PC 9	Rts	E	2.0		<1.0
PI 10		E	2.0		<1.0
PC 11		C	1.0		<2.0
PI 12		C			
PC 13	Plant	SDS			
PI 14	Plant	SDS			
PC 15	Rts	G			
PI 16		G			
PC 17		J	2.0		<1.0

Preliminary Studies
New Mexico
Four Corners

Element: Cadmium — Plants

Sample No.	Location	Code	Sample Wt. g	Solution Concentration µg/ml	Plant Concentration µg/g
PC 1	Stems	E	2.0	<0.01	<0.5
PI 2	Stems	E			
PC 3	Lvs	J			
PI 4		J			
PC 5		C			
PI 6		C			
PC 7		G	1.0		<1.0
PI 8		G	1.0		<1.0
PC 9	Rts	E	2.0		<0.5
PI 10		E	2.0		<0.5
PC 11		C	1.0		<1.0
PI 12		C			
PC 13	Plant	SDS			
PI 14	Plant	SDS			
PC 15	Rts	G			
PI 16		G			
PC 17		J	2.0		0.5

Element: Cobalt

PC 1	Stems	E	2.0	<0.075	<3.75
PI 2	Stems	E		0.1	5.0
PC 3	Lvs	J		<0.075	<3.75
PI 4		J			
PC 5		C			
PI 6		C			
PC 7		G	1.0		<7.5
PI 8		G	1.0		<7.5
PC 9	Rts	E	2.0	0.1	5.0
PI 10		E	2.0	<0.075	<3.75
PC 11		C	1.0		<7.5
PI 12		C			
PC 13	Plant	SDS			
PI 14	Plant	SDS			
PC 15	Rts	G			
PI 16		G			
PC 17		J	2.0		<3.75

Preliminary Studies
New Mexico
Four Corners

Plants

Sample No.	Location	Code	Sample Wt. g	Solution Concentration µg/ml	Plant Concentration µg/g
Element: Chromium					
PC 1	Stems	E	2.0	<0.05	2.5
PI 2	Stems	E			
PC 3	Lvs	J			
PI 4		J			
PC 5		C		<0.075	3.75
PI 6		C		0.05	2.5
PC 7		G	1.0	<0.05	<5.0
PI 8		G	1.0		<5.0
PC 9	Rts	E	2.0		<2.5
PI 10		E	2.0		<2.5
PC 11		C	1.0		<5.0
PI 12		C			<5.0
PC 13	Plant	SDS			<5.0
PI 14	Plant	SDS		<0.075	7.5
PC 15	Rts	G		0.05	<5.0
PI 16		G		<0.05	<5.0
PC 17		J	2.0	0.05	<2.5
Element: Fluoride					
PC 1	Stems	E	2.0	1.62	81
PI 2	Stems	E		0.9	45
PC 3	Lvs	J		1.20	60
PI 4		J		1.05	52.5
PC 5		C		1.15	57.5
PI 6		C		0.46	23
PC 7		G	1.0	0.24	24
PI 8		G	1.0	1.08	108
PC 9	Rts	E	2.0	0.52	26
PI 10		E	2.0	0.22	11
PC 11		C	1.0	0.46	46
PI 12		C		0.57	57
PC 13	Plant	SDS		--	--
PI 14	Plant	SDS		0.44	44
PC 15	Rts	G		0.54	54
PI 16		G		0.60	60
PC 17		J	2.0	0.28	14

Preliminary Studies
New Mexico
Four Corners

Element: Manganese

Plants

Sample No.	Location	Code	Sample Wt. g	Solution Concentration µg/ml	Plant Concentration µg/g
PC 1	Stems	E	2.0	1.0	50
PI 2	Stems	E		1.04	52
PC 3	Lvs	J		0.475	23.75
PI 4		J		0.36	18
PC 5		C		1.23	61.5
PI 6		C		1.03	51.5
PC 7		G	1.0	0.8	80
PI 8		G	1.0	1.22	122
PC 9	Rts	E	2.0	0.43	21.5
PI 10		E	2.0	0.41	20.5
PC 11		C	1.0	0.42	42
PI 12		C		0.40	40
PC 13	Plant	SDS		0.38	38
PI 14	Plant	SDS		0.78	78
PC 15	Rts	G		0.55	55
PI 16		G		0.57	57
PC 17		J	2.0	0.51	25.5

Element: Molybdenum

PC 1	Stems	E	2.0	<0.5	<25
PI 2	Stems	E			
PC 3	Lvs	J			
PI 4		J			
PC 5		C			
PI 6		C			
PC 7		G	1.0		<50
PI 8		G	1.0		<50
PC 9	Rts	E	2.0		<25
PI 10		E	2.0		<25
PC 11		C	1.0		<50
PI 12		C			
PC 13	Plant	SDS			
PI 14	Plant	SDS			
PC 15	Rts	G			
PI 16		G			
PC 17		J	2.0		<25

Preliminary Studies
New Mexico
Four Corners

Element: Nickel — Plants

Sample No.	Location	Code	Sample Wt. g	Solution Concentration µg/ml	Plant Concentration µg/g
PC 1	Stems	E	2.0	<0.05	<2.5
PI 2	Stems	E			
PC 3	Lvs	J			
PI 4		J			
PC 5		C		0.1	5.0
PI 6		C		0.06	3.0
PC 7		G	1.0	<0.05	<5.0
PI 8		G	1.0		<5.0
PC 9	Rts	E	2.0		<2.5
PI 10		E	2.0	0.06	3.0
PC 11		C	1.0	<0.05	<5.0
PI 12		C		<0.05	<5.0
PC 13	Plant	SDS		0.08	8.0
PI 14	Plant	SDS		0.06	6.0
PC 15	Rts	G			
PI 16		G			
PC 17		J	2.0	0.1	5.0

Element: Lead (Pb)

PC 1	Stems	E	2.0	<0.1	<5.0
PI 2	Stems	E			
PC 3	Lvs	J			
PI 4		J			
PC 5		C			
PI 6		C		0.14	7.0
PC 7		G	1.0	<0.1	<10.0
PI 8		G	1.0		<10.0
PC 9	Rts	E	2.0		<5.0
PI 10		E	2.0	0.14	7.0
PC 11		C	1.0	<0.1	<10.0
PI 12		C			
PC 13	Plant	SDS			
PI 14	Plant	SDS			
PC 15	Rts	G			
PI 16		G			
PC 17		J	2.0	<0.1	<5.0

Main Samples
New Mexico
Four Corners

Element: Arsenic

Soil: 0.002 N H_2SO_4 Extraction

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml (1)	(2)	Average Sol'n Concentration	Soil Concentration µg/gram
C-1	SC 1(1,2) 0	10.0 g	< 0.02		<0.02	<0.2
C-2	1(1,2) 10					
C-3	1(1,2) 0			<0.02		
C-4	1(1,2) 10					
C-5	1(1,2) 0					
C-6	1(1,2) 10					
C-7	2(1,2) 0					
C-8	2(1,2) 10					
C-9	2(1,2) 0					
C-10	2(1,2) 10					
C-11	3(1,2) 0					
C-12	3(1,2) 10					
C-13	3(1,2) 0					
C-14	3(1,2) 10			0.022	0.02	0.2
C-15	3(1,2) 0				<0.02	<0.2
C-16	3(1,2) 10					
I-17	SI 1(1,2) 0					
I-18	1(1,2) 10			<0.02		
I-19	1(1,2) 0					
I-20	1(1,2) 10					
I-21	1(1,2) 0					
I-22	1(1,2) 10					
I-23	2(1,2) 0					
I-24	2(1,2) 10					
I-25	2(1,2) 0					
I-26	2(1,2) 10					
I-27	3(1,2) 0					
I-28	3(1,2) 10					
I-29	3(1,2) 0					
I-30	3(1,2) 10			<0.02		
I-31	3(1,2) 0					
I-32	3(1,2) 10			51		

Element: Beryllium

Soil: 0.002 N H_2SO_4 Extraction

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml (1)	(2)	Average Sol'n Concentration	Soil Concentration µg/gram
C-1	SC 1(1,2) 0	10.0 g	<0.0025	<0.0025	<0.0025	<0.025
C-2	1(1,2) 10					
C-3	1(1,2) 0					
C-4	1(1,2) 10					
C-5	1(1,2) 0					
C-6	1(1,2) 10					
C-7	2(1,2) 0					
C-8	2(1,2) 10					
C-9	2(1,2) 0					
C-10	2(1,2) 10					
C-11	3(1,2) 0					
C-12	3(1,2) 10					
C-13	3(1,2) 0					
C-14	3(1,2) 10					
C-15	3(1,2) 0					
C-16	3(1,2) 10					
I-17	SI 1(1,2) 0					
I-18	1(1,2) 10					
I-19	1(1,2) 0					
I-20	1(1,2) 10					
I-21	1(1,2) 0					
I-22	1(1,2) 10					
I-23	2(1,2) 0					
I-24	2(1,2) 10					
I-25	2(1,2) 0					
I-26	2(1,2) 10					
I-27	3(1,2) 0					
I-28	3(1,2) 10					
I-29	3(1,2) 0					
I-30	3(1,2) 10					
I-31	3(1,2) 0					
I-32	3(1,2) 10					

Element: Cadmium

Soil: 0.002 N H_2SO_4 Extraction

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml (1)	(2)	Average Sol'n Concentration	Soil Concentration µg/gram
C-1	SC 1(1,2) 0	10.0 g	<0.005	APDC	<0.005	<0.05
C-2	1(1,2) 10			extraction		
C-3	1(1,2) 0			no		
C-4	1(1,2) 10			duplicate		
C-5	1(1,2) 0			run		
C-6	1(1,2) 10					
C-7	2(1,2) 0					
C-8	2(1,2) 10					
C-9	2(1,2) 0					
C-10	2(1,2) 10					
C-11	3(1,2) 0					
C-12	3(1,2) 10					
C-13	3(1,2) 0					
C-14	3(1,2) 10					
C-15	3(1,2) 0					
C-16	3(1,2) 10					
I-17	SI 1(1,2) 0					
I-18	1(1,2) 10					
I-19	1(1,2) 0					
I-20	1(1,2) 10					
I-21	1(1,2) 0					
I-22	1(1,2) 10					
I-23	2(1,2) 0					
I-25	2(1,2) 0					
I-26	2(1,2) 10					
I-27	3(1,2) 0					
I-28	3(1,2) 10					
I-29	3(1,2) 0					
I-30	3(1,2) 10					
I-31	3(1,2) 0					
I-32	3(1,2) 10					

Element: Chromium

Soil: 0.002 N H_2SO_4 Extraction

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml (1)	(2)	Average Sol'n Concentration	Soil Concentration µg/gram
C-1	SC 1(1,2) 0	10 g	0.011	<0.01	0.01	0.10
C-2	1(1,2) 10		<0.01		<0.01	<0.10
C-3	1(1,2) 0			0.011	0.01	0.10
C-4	1(1,2) 10			<0.01	<0.01	<0.1
C-5	1(1,2) 0					
C-6	1(1,2) 10					
C-7	2(1,2) 0					
C-8	2(1,2) 10					
C-9	2(1,2) 0					
C-10	2(1,2) 10		0.018		0.018	0.18
C-11	3(1,2) 0		<0.01		<0.01	<0.1
C-12	3(1,2) 10					
C-13	3(1,2) 0					
C-14	3(1,2) 10		0.015	0.011	0.013	0.13
C-15	3(1,2) 0		<0.01	<0.01	<0.01	<0.1
C-16	3(1,2) 10					
I-17	SI 1(1,2) 0					
I-18	1(1,2) 10					
I-19	1(1,2) 0					
I-20	1(1,2) 10					
I-21	1(1,2) 0					
I-22	1(1,2) 10					
I-23	2(1,2) 0					
I-24	2(1,2) 10					
I-25	2(1,2) 0					
I-26	2(1,2) 10					
I-27	3(1,2) 0					
I-28	3(1,2) 10					
I-29	3(1,2) 0					
I-30	3(1,2) 10					
I-31	3(1,2) 0					
I-32	3(1,2) 10					

Element: Fluoride

Soil: 0.002 N H_2SO_4 Extraction

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml (1)	(2)	Average Sol'n Concentration	Soil Concentration µg/gram
C-1	SC 1(1,2) 0	10.0 g	0.06	0.08	0.07	0.7
C-2	1(1,2) 10		0.42	0.50	0.46	4.6
C-3	1(1,2) 0		0.26	0.17	0.22	2.2
C-4	1(1,2) 10		0.36	0.39	0.38	3.8
C-5	1(1,2) 0		0.73	0.69	0.71	7.1
C-6	1(1,2) 10		0.73	0.60	0.67	6.7
C-7	2(1,2) 0		0.06	<0.05	0.06	0.6
C-8	2(1,2) 10		0.07	0.09	0.08	0.8
C-9	2(1,2) 0		<0.05	<0.05	<0.05	<0.5
C-10	2(1,2) 10		0.24	0.23	0.24	2.4
C-11	3(1,2) 0		0.05	<0.05	0.05	0.5
C-12	3(1,2) 10		0.05	0.05	0.05	0.5
C-13	3(1,2) 0		<0.05	<0.05	<0.05	<0.5
C-14	3(1,2) 10		0.29	0.39	0.34	3.4
C-15	3(1,2) 0		0.11	0.13	0.12	1.2
C-16	3(1,2) 10		0.05	0.10	0.08	0.8
I-17	SI 1(1,2) 0		0.07	<0.05	0.07	0.7
I-18	1(1,2) 10		<0.05	<0.05	<0.05	<0.5
I-19	1(1,2) 0		0.06	0.08	0.07	0.7
I-20	1(1,2) 10		<0.05	<0.05	<0.05	<0.5
I-21	1(1,2) 0					
I-22	1(1,2) 10					
I-23	2(1,2) 0					
I-24	2(1,2) 10					
I-25	2(1,2) 0					
I-26	2(1,2) 10					
I-27	3(1,2) 0					
I-28	3(1,2) 10		0.11	0.13	0.12	1.2
I-29	3(1,2) 0		0.06	0.12	0.09	0.9
I-30	3(1,2) 10		0.19	0.18	0.19	1.9
I-31	3(1,2) 0		<0.05	0.17	0.17	1.7
I-32	3(1,2) 10		<0.05	<0.05	<0.05	<0.5

Element: Lead

Soil: 0.002 N H_2SO_4 Extraction

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml (1)	(2)	Average Sol'n Concentration	Soil Concentration µg/gram
C-1	SC 1(1,2) 0	10.0 g	<0.05	APDC	<0.05	<0.5
C-2	1(1,2) 10			extraction		
C-3	1(1,2) 0			no		
C-4	1(1,2) 10			duplicates		
C-5	1(1,2) 0					
C-6	1(1,2) 10					
C-7	2(1,2) 0					
C-8	2(1,2) 10					
C-9	2(1,2) 0					
C-10	2(1,2) 10					
C-11	3(1,2) 0					
C-12	3(1,2) 10					
C-13	3(1,2) 0					
C-14	3(1,2) 10					
C-15	3(1,2) 0					
C-16	3(1,2) 10					
I-17	SI 1(1,2) 0					
I-18	1(1,2) 10					
I-19	1(1,2) 0					
I-20	1(1,2) 10					
I-21	1(1,2) 0					
I-22	1(1,2) 10					
I-23	2(1,2) 0					
I-24	2(1,2) 10					
I-25	2(1,2) 0					
I-26	2(1,2) 10					
I-27	3(1,2) 0					
I-28	3(1,2) 10					
I-29	3(1,2) 0					
I-30	3(1,2) 10					
I-31	3(1,2) 0					
I-32	3(1,2) 10					

Element: Manganese

Soil: 0.002 N H_2SO_4 Extraction

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml (1)	(2)	Average Sol'n Concentration	Soil Concentration µg/gram
C-1	SC 1(1,2) 0	10 g	<0.01	<0.01	<0.01	<0.1
C-2	1(1,2) 10					
C-3	1(1,2) 0					
C-4	1(1,2) 10					
C-5	1(1,2) 0		0.013	0.022	0.018	0.18
C-6	1(1,2) 10		<0.01	0.065	0.065	0.65
C-7	2(1,2) 0		0.013	0.042	0.028	0.28
C-8	2(1,2) 10		0.013	<0.01	0.013	0.13
C-9	2(1,2) 0		<0.01	0.023	0.023	0.23
C-10	2(1,2) 10		0.023	0.033	0.028	0.28
C-11	3(1,2) 0		0.015	0.052	0.034	0.34
C-12	3(1,2) 10		<0.01	<0.01	<0.01	<0.1
C-13	3(1,2) 0		<0.01	0.033	0.033	0.33
C-14	3(1,2) 10		0.031	0.046	0.039	0.39
C-15	3(1,2) 0		0.046	0.027	0.037	0.37
C-16	3(1,2) 10		<0.01	<0.01	<0.01	<0.1
I-17	SI 1(1,2) 0		0.02	0.022	0.021	0.21
I-18	1(1,2) 10		<0.01	<0.01	<0.01	<0.1
I-19	1(1,2) 0		0.063	0.062	0.063	0.63
I-20	1(1,2) 10		0.020	0.017	0.019	0.19
I-21	1(1,2) 0		0.040	0.019	0.030	0.30
I-22	1(1,2) 10		0.010	0.025	0.018	0.18
I-23	2(1,2) 0		0.01	0.016	0.013	0.13
I-24	2(1,2) 10		0.012	0.014	0.013	0.13
I-25	2(1,2) 0		0.028	0.043	0.036	0.36
I-26	2(1,2) 10		0.033	0.024	0.029	0.29
I-27	3(1,2) 0		0.018	0.016	0.017	0.17
I-28	3(1,2) 10		0.014	0.014	0.014	0.14
I-29	3(1,2) 0		<0.01	0.022	0.022	0.22
I-30	3(1,2) 10		<0.01	0.032	0.032	0.32
I-31	3(1,2) 0		0.038	0.055	0.047	0.47
I-32	3(1,2) 10		0.022	0.037	0.030	0.30

Element: Molybdenum

Soil: 0.002 N H_2SO_4 Extraction

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml (1)	(2)	Average Sol'n Concentration	Soil Concentration µg/gram
C-1	SC 1(1,2) 0	10.0 g	<0.05	APDC	<0.05	<0.5
C-2	1(1,2) 10			extraction		
C-3	1(1,2) 0			no		
C-4	1(1,2) 10			duplicates		
C-5	1(1,2) 0					
C-6	1(1,2) 10					
C-7	2(1,2) 0					
C-8	2(1,2) 10					
C-9	2(1,2) 0					
C-10	2(1,2) 10					
C-11	3(1,2) 0					
C-12	3(1,2) 10					
C-13	3(1,2) 0					
C-14	3(1,2) 10					
C-15	3(1,2) 0					
C-16	3(1,2) 10					
I-17	SI 1(1,2) 0					
I-18	1(1,2) 10					
I-19	1(1,2) 0					
I-20	1(1,2) 10					
I-21	1(1,2) 0					
I-22	1(1,2) 10					
I-23	2(1,2) 0					
I-24	2(1,2) 10					
I-25	2(1,2) 0					
I-26	2(1,2) 10					
I-27	3(1,2) 0					
I-28	3(1,2) 10					
I-29	3(1,2) 0					
I-30	3(1,2) 10					
I-31	3(1,2) 0					
I-32	3(1,2) 10					

Element: Nickel

Soil: 0.002 N H_2SO_4 Extraction

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml (1)	(2)	Average Sol'n Concentration	Soil Concentration µg/gram
C-1	SC 1(1,2) 0	10 g	<0.01	<0.01	<0.01	<0.10
C-2	1(1,2) 10					
C-3	1(1,2) 0					
C-4	1(1,2) 10					
C-5	1(1,2) 0					
C-6	1(1,2) 10					
C-7	2(1,2) 0					
C-8	2(1,2) 10					
C-9	2(1,2) 0			0.02	0.02	0.12
C-10	2(1,2) 10		0.014	<0.01	0.01	0.10
C-11	3(1,2) 0		<0.01		<0.01	<0.10
C-12	3(1,2) 10					
C-13	3(1,2) 0					
C-14	3(1,2) 10					
C-15	3(1,2) 0					
C-16	3(1,2) 10					
I-17	SI 1(1,2) 0					
I-18	1(1,2) 10					
I-19	1(1,2) 0					
I-20	1(1,2) 10					
I-21	1(1,2) 0					
I-22	1(1,2) 10					
I-23	2(1,2) 0					
I-24	2(1,2) 10					
I-25	2(1,2) 0					
I-26	2(1,2) 10					
I-27	3(1,2) 0					
I-28	3(1,2) 10					
I-29	3(1,2) 0					
I-30	3(1,2) 10					
I-31	3(1,2) 0					
I-32	3(1,2) 10					

Element: Selenium

Soil: 0.002 N H_2SO_4 Extraction

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml (1)	(2)	Average Sol'n Concentration	Soil Concentration µg/gram
C-1	SC 1(1,2) 0	10.0 g	0.0029		0.0029	0.029
C-2	1(1,2) 10		0.0029		0.0029	0.029
C-3	1(1,2) 0		0.0036		0.0036	0.036
C-4	1(1,2) 10		<0.0025		<0.0025	<0.025
C-5	1(1,2) 0					
C-6	1(1,2) 10					
C-7	2(1,2) 0					
C-8	2(1,2) 10					
C-9	2(1,2) 0					
C-10	2(1,2) 10			<0.0025		
C-11	3(1,2) 0					
C-12	3(1,2) 10					
C-13	3(1,2) 0					
C-14	3(1,2) 10		0.0040		0.0040	0.040
C-15	3(1,2) 0		0.0031		0.0031	0.031
C-16	3(1,2) 10		0.0106		0.0106	0.106
I-17	SI 1(1,2) 0		<0.0025		<0.0025	<0.025
I-18	1(1,2) 10					
I-19	1(1,2) 0			<0.0025		
I-20	1(1,2) 10					
I-21	1(1,2) 0		0.0033		0.0033	0.033
I-22	1(1,2) 10		0.0066		0.0066	0.066
I-23	2(1,2) 0		0.0132	<0.0025	0.0132	0.132
I-24	2(1,2) 10		0.0060		0.0060	0.060
I-25	2(1,2) 0		0.0052		0.0052	0.052
I-26	2(1,2) 10		<0.0025		<0.0025	<0.025
I-27	2(1,2) 0		0.0029		0.0029	0.029
I-28	3(1,2) 10		0.0141		0.0141	0.141
I-29	3(1,2) 0		0.0102		0.0102	0.102
I-30	3(1,2) 10		0.0093		0.0093	0.093
I-31	3(1,2) 0		<0.0025		<0.0025	<0.025
I-32	3(1,2) 10		<0.0025		<0.0025	<0.025

Main Samples
New Mexico
Four Corners

Element: Arsenic

Soil: 1.0 N HCl Extraction

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml (1)	(2)	Average Sol'n Concentration	Soil Concentration µg/gram
C-1	SC 1(1,2) 0	10.0 g	<0.02		<0.02	<0.2
C-2	1(1,2) 10					
C-3	1(1,2) 0					
C-4	1(1,2) 10					
C-5	1(1,2) 0					
C-6	1(1,2) 10					
C-7	2(1,2) 0					
C-8	2(1,2) 10					
C-9	2(1,2) 0		0.023		0.023	0.23
C-10	2(1,2)10		<0.02		<0.02	<0.20
C-11	3(1,2) 0		0.044	0.022	0.033	0.33
C-12	3(1,2) 10		0.022		0.022	0.22
C-13	3(1,2) 0		0.024		0.024	0.24
C-14	3(1,2) 10		0.04		0.04	0.40
C-15	3(1,2) 0		0.02		0.02	0.20
C-16	3(1,2) 10		0.029	0.043	0.036	0.36
I-17	SI 1(1,2) 0		<0.02		<0.02	<0.20
I-18	1(1,2) 10					
I-19	1(1,2) 0					
I-20	1(1,2) 10					
I-21	1(1,2) 0		0.031	0.02	0.026	0.26
I-22	1(1,2) 10		0.028		0.028	0.28
I-23	2(1,2) 0		0.028		0.028	0.28
I-24	2(1,2) 10		0.022		0.022	0.22
I-25	2(1,2) 0		0.021		0.021	0.21
I-26	2(1,2) 10		<0.02		<0.02	<0.20
I-27	3(1,2) 0		<0.02		<0.02	<0.20
I-28	3(1,2) 10		0.029		0.029	0.29
I-29	3(1,2) 0		0.037	0.027	0.032	0.32
I-30	3(1,2) 10		<0.02		<0.020	<0.20
I-31	3(1,2) 0		0.023		0.023	0.23
I-32	3(1,2) 10		0.02		0.020	0.20

Element: Beryllium

Soil: 1.0 N HCl Extraction

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml (1)	(2)	Average Sol'n Concentration	Soil Concentration µg/gram
C-1	SC 1(1,2) 0	10.0 g	0.008	0.007	0.008	0.08
C-2	1(1,2) 10		0.004	0.004	0.004	0.04
C-3	1(1,2) 0		0.007	0.004	0.006	0.06
C-4	1(1,2) 10		0.007	0.007	0.007	0.07
C-5	1(1,2) 0		0.007	0.004	0.006	0.06
C-6	1(1,2) 10		0.006	0.006	0.006	0.06
C-7	2(1,2) 0		0.012	0.014	0.013	0.13
C-8	2(1,2) 10		0.004	0.003	0.004	0.04
C-9	2(1,2) 0		0.017	0.016	0.017	0.17
C-10	2(1,2) 10		0.011	0.014	0.013	0.013
C-11	3(1,2) 0		0.006	0.007	0.007	0.07
C-12	3(1,2) 10		0.018	0.016	0.017	0.17
C-13	3(1,2) 0		0.014	0.011	0.013	0.13
C-14	3(1,2) 10		0.018	0.017	0.018	0.18
C-15	3(1,2) 0		0.018	0.017	0.018	0.18
C-16	3(1,2) 10		0.019	0.018	0.019	0.19
I-17	SI 1(1,2) 0		0.01	0.006	0.008	0.08
I-18	1(1,2) 10		0.011	0.007	0.009	0.09
I-19	1(1,2) 0		0.006	0.007	0.007	0.07
I-20	1(1,2) 10		0.004	0.006	0.005	0.05
I-21	1(1,2) 0		0.007	0.008	0.008	0.08
I-22	1(1,2) 10		0.007	0.007	0.007	0.07
I-23	2(1,2) 0		0.007	0.007	0.007	0.07
I-24	2(1,2) 10		0.007	0.008	0.008	0.08
I-25	2(1,2) 0		0.004	0.004	0.004	0.04
I-26	2(1,2) 10		0.003	0.008	0.006	0.06
I-27	3(1,2) 0		0.004	0.004	0.004	0.04
I-28	3(1,2) 10		0.008	0.007	0.008	0.08
I-29	3(1,2) 0		0.007	0.007	0.007	0.07
I-30	3(1,2) 10		0.007	0.006	0.007	0.07
I-31	3(1,2) 0		0.005	0.005	0.006	0.05
I-32	3(1,2) 10		0.005	0.005	0.005	0.05

Element: Cadmium

Soil: 1.0 N HCl Extraction

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml (1)	(2)	Average Sol'n Concentration	Soil Concentration µg/gram
C-1	SC 1(1,2) 0	10.0 g	<0.005	<0.005	<0.005	<0.05
C-2	1(1,2) 10					
C-3	1(1,2) 0					
C-4	1(1,2) 10			0.005		
C-5	1(1,2) 0		0.006	0.005	0.005	0.05
C-6	1(1,2) 10		<0.005	0.009		
C-7	2(1,2) 0		<0.005	<0.005	<0.005	<0.05
C-8	2(1,2) 10					
C-9	2(1,2) 0		0.007	0.01	0.009	0.09
C-10	2(1,2) 10		0.017	0.009	0.013	0.13
C-11	3(1,2) 0		<0.005	0.006	0.005	0.05
C-12	3(1,2) 10		<0.005	<0.005	<0.005	<0.05
C-13	3(1,2) 0					
C-14	3(1,2) 10		0.007	0.005	0.006	0.06
C-15	3(1,2) 0		<0.005	<0.005	<0.005	<0.05
C-16	3(1,2) 10					
I-17	SI 1(1,2) 0		0.007	0.011	0.009	0.09
I-18	1(1,2) 10		0.010	0.009	0.010	0.10
I-19	1(1,2) 0		<0.005	<0.005	<0.005	<0.50
I-20	1(1,2) 10		0.008	<0.005	0.006	0.60
I-21	1(1,2) 0		<0.005	<0.005	<0.005	<0.05
I-22	1(1,2) 10		0.005	<0.005		
I-23	2(1,2) 0					
I-24	2(1,2) 10					
I-25	2(1,2) 0					
I-26	2(1,2) 10					
I-27	3(1,2) 0					
I-28	3(1,2) 10		0.007	0.008	0.008	0.08
I-29	3(1,2) 0		<0.005	<0.005	<0.005	<0.05
I-30	3(1,2) 10					
I-31	3(1,2) 0			0.005		
I-32	3(1,2) 10		0.008	0.007	0.008	0.08

Element: Chromium

Soil: 1.0 N HCl Extraction

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml (1)	(2)	Average Sol'n Concentration	Soil Concentration µg/gram
C-1	SC 1(1,2) 0	10 g	0.177	0.026	0.102	1.02*
C-2	1(1,2) 10		0.040	0.046	0.043	0.43
C-3	1(1,2) 0		0.043	0.029	0.036	0.36
C-4	1(1,2) 10		0.029	0.046	0.038	0.38
C-5	1(1,2) 0		0.034	0.037	0.03	0.3
C-6	1(1,2) 10		0.034	0.027	0.03	0.3
C-7	2(1,2) 0		0.037	0.040	0.039	0.39
C-8	2(1,2) 10		0.033	0.039	0.031	0.31
C-9	2(1,2) 0		0.288	0.052	0.170	1.70*
C-10	2(1,2) 10		0.086	0.096	0.091	0.91
C-11	3(1,2) 0		0.053	0.046	0.050	0.50
C-12	3(1,2) 10		0.070	0.072	0.071	0.71
C-13	3(1,2) 0		0.123	0.052	0.088	0.88*
C-14	3(1,2) 10		0.067	0.053	0.060	0.60
C-15	3(1,2) 0		0.052	0.070	0.061	0.61
C-16	3(1,2) 10		0.049	0.043	0.046	0.46
I-17	SI 1(1,2) 0		0.163	0.086	0.125	1.25
I-18	1(1,2) 10		0.119	0.137	0.128	1.28
I-19	1(1,2) 0		0.107	0.176	0.116	1.16
I-20	1(1,2) 10		0.057	0.148	0.102	1.02*
I-21	1(1,2) 0		0.123	0.062	0.093	0.93*
I-22	1(1,2) 10		0.060	0.067	0.06	0.6
I-23	2(1,2) 0		0.067	0.070	0.069	0.69
I-24	2(1,2) 10		0.057	0.067	0.062	0.62
I-25	2(1,2) 0		0.441	0.081	0.261	2.61*
I-26	2(1,2) 10		0.032	0.019	0.026	0.26
I-27	3(1,2) 0		0.067	0.085	0.076	0.76
I-28	3(1,2) 10		0.086	0.081	0.084	0.83
I-29	3(1,2) 0		0.046	0.046	0.046	0.46
I-30	3(1,2) 10		0.053	0.074	0.064	0.64
I-31	3(1,2) 0		0.049	0.074	0.062	0.62
I-32	3(1,2) 10		0.067	0.060	0.064	0.64

* data confirmed - large differences between duplicates may be due to non-homogeneity of soil sample.

Element: Fluoride

Soil: 1.0 N HCl Extraction

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml (1)	(2)	Average Sol'n Concentration	Soil Concentration µg/gram
C-1	SC 1(1,2) 0	10.0 g	0.22	0.25	0.24	2.4
C-2	1(1,2) 10		0.44	0.43	0.44	4.4
C-3	1(1,2) 0		0.36	0.36	0.36	3.6
C-4	1(1,2) 10		0.47	0.49	0.48	4.8
C-5	1(1,2) 0		0.47	0.47	0.47	4.7
C-6	1(1,2) 10		0.76	0.79	0.78	7.8
C-7	2(1,2) 0		0.06	<0.05	0.06	0.6
C-8	2(1,2) 10		0.15	0.14	0.15	1.5
C-9	2(1,2) 0		<0.05	<0.05	<0.05	<0.5
C-10	2(1,2) 10		0.28	0.28	0.28	2.8
C-11	3(1,2) 0		0.19	0.18	0.19	1.9
C-12	3(1,2) 10		<0.05	<0.05	<0.05	<0.5
C-13	3(1,2) 0					
C-14	3(1,2) 10					
C-15	3(1,2) 0		0.10	0.10	0.10	1.0
C-16	3(1,2) 10		0.07	0.06	0.07	0.7
I-17	SI 1(1,2) 0		0.80	0.93	0.87	8.7
I-18	1(1,2) 10		1.34	1.27	1.31	13.1
I-19	1(1,2) 0		0.35	0.33	0.34	3.4
I-20	1(1,2) 10		0.36	0.35	0.36	3.6
I-21	1(1,2) 0		0.37	0.35	0.36	3.6
I-22	1(1,2) 10		0.39	0.39	0.39	3.9
I-23	2(1,2) 0		0.11	0.12	0.12	1.2
I-24	2(1,2) 10		0.19	0.18	0.19	1.9
I-25	2(1,2) 0		0.22	0.23	0.23	2.3
I-26	2(1,2) 10		<0.05	<0.05	<0.05	<0.5
I-27	3(1,2) 0		0.44	0.44	0.44	4.4
I-28	3(1,2) 10		1.27	1.18	1.23	12.3
I-29	3(1,2) 0		0.12	0.12	0.12	1.2
I-30	3(1,2) 10		0.31	0.31	0.31	3.1
I-31	3(1,2) 0		0.60	0.68	0.64	6.4
I-32	3(1,2) 10		0.80	0.75	0.78	7.8

Element: Lead

Soil: 1.0 N HCl Extraction

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml (1)	(2)	Average Sol'n Concentration	Soil Concentration µg/gram
C-1	SC 1(1,2) 0	10.0 g	<0.1	0.21	0.21	2.1
C-2	1(1,2) 10		0.13	0.23	0.18	1.8
C-3	1(1,2) 0		0.16	0.16	0.16	1.6
C-4	1(1,2) 10		0.21	0.38	0.30	3.0
C-5	1(1,2) 0		0.20	0.19	0.20	2.0
C-6	1(1,2) 10		0.20	0.32	0.26	2.6
C-7	2(1,2) 0		0.18	0.15	0.17	1.7
C-8	2(1,2) 10		0.15	0.14	0.14	1.4
C-9	2(1,2) 0		<0.1	<0.1	<0.10	<1.0
C-10	2(1,2) 10		0.39	0.27	0.33	3.3
C-11	3(1,2) 0		0.28	0.34	0.31	3.1
C-12	3(1,2) 10		0.26	0.34	0.30	3.0
C-13	3(1,2) 0		0.14	0.19	0.17	1.7
C-14	3(1,2) 10		0.15	0.16	0.16	1.6
C-15	3(1,2) 0		0.23	0.19	0.21	2.1
C-16	3(1,2) 10		0.31	0.23	0.27	2.7
I-17	SI 1(1,2) 0		0.20	0.23	0.22	2.2
I-18	1(1,2) 10		0.16	0.23	0.20	2.0
I-19	1(1,2) 0		0.27	0.20	0.24	2.4
I-20	1(1,2) 10		0.10	<0.1	0.10	1.0
I-21	1(1,2) 0		0.21	0.19	0.20	2.0
I-22	1(1,2) 10		0.27	0.13	0.20	2.0
I-23	2(1,2) 0		0.32	0.20	0.26	2.6
I-24	2(1,2) 10		0.12	<0.1	0.12	1.2
I-25	2(1,2) 0		0.12	<0.1	0.12	1.2
I-26	2(1,2) 10		<0.1	<0.1	<0.10	<1.0
I-27	3(1,2) 0		0.26	0.26	0.26	2.6
I-28	3(1,2) 10		0.23	0.23	0.23	2.3
I-29	3(1,2) 0		0.15	0.21	0.18	1.8
I-30	3(1,2) 10		0.26	0.20	0.23	2.3
I-31	3(1,2) 0		0.34	0.32	0.33	3.3
I-32	3(1,2) 10		0.32	0.26	0.29	2.9

Element: Manganese

Soil: 1.0 N HCl Extraction

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml (1)	(2)	Average Sol'n Concentration	Soil Concentration µg/gram
C-1	SC 1(1,2) 0	10.0 g	9.74	9.64	9.69	96.9
C-2	1(1,2) 10		10.00	10.12	10.06	100.6
C-3	1 (1,2) 0		9.60	9.85	9.73	97.3
C-4	1(1,2) 10		10.02	10.28	10.15	101.5
C-5	1(1,2) 0		7.91	7.75	7.83	78.3
C-6	1(1,2) 10		7.27	8.20	7.74	77.4
C-7	2(1,2) 0		19.58	18.65	19.12	191.2
C-8	2(1,2) 10		12.60	12.33	12.47	124.7
C-9	2(1,2) 0		15.58	14.53	15.06	150.5
C-10	2(1,2) 10		12.60	11.67	12.14	121.4
C-11	3(1,2) 0		12.03	11.30	11.67	116.7
C-12	3(1,2) 10		11.17	11.05	11.11	111.1
C-13	3(1,2) 0		13.12	13.12	13.12	131.2
C-14	3(1,2) 10		13.50	13.90	13.70	137.0
C-15	3(1,2) 0		13.62	13.50	13.56	135.6
C-16	3(1,2) 10		13.75	13.34	13.55	135.5
I-17	SI 1(1,2) 0		20.11	21.63	20.87	208.7
I-18	1(1,2) 10		20.05	20.05	20.05	200.5
I-19	1(1,2) 0		13.62	13.60	13.61	136.1
I-20	1(1,2) 10		12.60	12.32	12.46	124.6
I-21	1(1,2) 0		11.50	11.04	11.27	112.7
I-22	1(1,2) 10		11.42	14.17	12.80	128.0
I-23	2(1,2) 0		12.32	11.68	12.0	120.0
I-24	2(1,2) 10		11.50	11.04	11.27	112.7
I-25	2(1,2) 0		10.00	9.74	9.87	98.7
I-26	2(1,2) 10		2.96	3.18	3.07	30.7
I-27	3(1,2) 0		12.60	12.55	12.58	125.8
I-28	3(1,2) 10		18.40	18.05	18.23	182.3
I-29	3(1,2) 0		11.30	14.17	12.74	127.4
I-30	3(1,2) 10		11.68	11.54	11.61	116.1
I-31	3(1,2) 0		14.15	14.27	14.21	142.1
I-32	3(1,2) 10		14.40	11.63	13.02	130.2

Element: Mercury

Soil: Persulfate - Acid Digestion

Sample No.	Location Code	Sample Wt.	Concentration µg/gram (1)	(2)	Soil Concentration µg/gram
C-1	SC 1(1,2) 0	1.0 g	0.01	0.01	0.01
C-2	1(1,2) 10		0.01	0.01	0.01
C-3	1(1,2) 0		0.01, 0.03	0.02	0.02
C-4	1(1,2) 10		0.01	0.01	0.01
C-5	1(1,2) 0		0.01	0.01	0.01
C-6	1(1,2) 10		<0.01	0.01	0.01
C-7	2(1,2) 0		0.02	0.015	0.02
C-8	2(1,2) 10		0.01	<0.01	0.01
C-9	2(1,2) 0		0.01	0.02	0.02
C-10	2(1,2) 10		0.02	0.02	0.02
C-11	3(1,2) 0		0.01	0.01	0.01
C-12	3(1,2) 10		0.05	0.07	0.06
C-13	3(1,2) 0		0.02	0.02	0.02
C-14	3(1,2) 10		0.04	0.04	0.04
C-15	3(1,2) 0		0.01	0.01	0.01
C-16	3(1,2) 10		0.02	0.03	0.03
I-17	SI 1(1,2) 0		0.01	0.01	0.01
I-18	1(1,2) 10		<0.01	<0.01	<0.01
I-19	1(1,2) 0		<0.01	<0.01	<0.01
I-20	1(1,2) 10		<0.01	<0.01	<0.01
I-21	1(1,2) 0		<0.01	0.01	0.01
I-22	1(1,2) 10		0.01	0.01	0.01
I-23	2(1,2) 0		0.01	0.01	0.01
I-24	2(1,2) 10		<0.01	<0.01	<0.01
I-25	2(1,2) 0		<0.01	<0.01	<0.01
I-26	2(1,2) 10		0.01	0.03	0.02
I-27	3(1,2) 0		<0.01	<0.01	<0.01
I-28	3(1,2) 10		<0.01	<0.01	<0.01
I-29	3(1,2) 0		<0.01	<0.01	<0.01
I-30	3(1,2) 10		<0.01	<0.01	<0.01
I-31	3(1,2) 0		<0.01	<0.01	<0.01
I-32	3(1,2) 10		<0.01	<0.01	<0.01

Element: Molybdenum

Soil: 1.0 N HCl Extraction

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml (1)	(2)	Average Sol'n Concentration	Soil Concentration µg/gram
C-1	SC 1(1,2) 0	10.0 g	<0.05	<0.05	<0.05	<0.5
C-2	1(1,2) 10					
C-3	1(1,2) 0					
C-4	1(1,2) 10					
C-5	1(1,2) 0					
C-6	1(1,2) 10					
C-7	2(1,2) 0					
C-8	2(1,2) 10					
C-9	2(1,2) 0					
C-10	2(1,2) 10					
C-11	3(1,2) 0					
C-12	3(1,2) 10					
C-13	3(1,2) 0					
C-14	3(1,2) 10					
C-15	3(1,2) 0					
C-16	3(1,2) 10					
I-17	SI 1(1,2) 0					
I-18	1(1,2) 10					
I-19	1(1,2) 0					
I-20	1(1,2) 10					
I-21	1(1,2) 0					
I-22	1(1,2) 10					
I-23	2(1,2) 0					
I-24	2(1,2) 10					
I-25	2(1,2) 0					
I-26	2(1,2) 10					
I-27	3(1,2) 0					
I-28	3(1,2) 10					
I-29	3(1,2) 0					
I-30	3(1,2) 10					
I-31	3(1,2) 0					
I-32	3(1,2) 10					

Element: Nickel

Soil: 1.0 N HCl Extraction

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml (1)	(2)	Average Sol'n Concentration	Soil Concentration µg/gram
C-1	SC 1(1,2) 0	10.0 g	0.123	0.049	0.086	0.86*
C-2	1(1,2) 10		0.038	0.058	0.048	0.48
C-3	1(1,2) 0		0.085	0.072	0.079	0.79
C-4	1(1,2) 10		0.110	0.112	0.111	1.11
C-5	1(1,2) 0		0.085	0.073	0.079	0.79
C-6	1(1,2) 10		0.086	0.086	0.086	0.86
C-7	2(1,2) 0		0.235	0.220	0.228	2.28
C-8	2(1,2) 10		0.074	0.070	0.072	0.72
C-9	2(1,2) 0		0.358	0.252	0.305	3.50
C-10	2(1,2) 10		0.175	0.164	0.170	1.70
C-11	3(1,2) 0		0.118	0.105	0.112	1.12
C-12	3(1,2) 10		0.150	0.148	0.149	1.49
C-13	3(1,2) 0		0.125	0.097	0.111	1.11
C-14	3(1,2) 10		0.162	0.136	0.149	1.49
C-15	3(1,2) 0		0.187	0.173	0.180	1.80
C-16	3(1,2) 10		0.175	0.167	0.171	1.71
I-17	SI 1(1,2) 0		0.175	0.113	0.144	1.44
I-18	1(1,2) 10		0.122	0.125	0.124	1.24
I-19	1(1,2) 0		0.104	0.112	0.108	1.08
I-20	1(1,2) 10		0.073	0.132	0.103	1.03
I-21	1(1,2) 0		0.153	0.110	0.135	1.35
I-22	1(1,2) 10		0.097	0.111	0.104	1.04
I-23	2(1,2) 0		0.080	0.059	0.070	0.70
I-24	2(1,2) 10		0.068	0.058	0.063	0.63
I-25	2(1,2) 0		0.238	0.085	0.162	1.62*
I-26	2(1,2) 10		0.075	0.070	0.073	0.73
I-27	3(1,2) 0		0.072	0.073	0.073	0.73
I-28	3(1,2) 10		0.143	0.137	0.140	1.40
I-29	3(1,2) 0		0.073	0.092	0.083	0.83
I-30	3(1,2) 10		0.097	0.092	0.095	0.95
I-31	3(1,2) 0		0.125	0.124	0.125	1.25
I-32	3(1,2) 10		0.123	0.111	0.117	1.17

* data confirmed - large differences between duplicates may be due to non-homogeneity of soil sample.

Element: Selenium

Soil: 1.0 N HCl Soil Extraction

Sample No.	Location Code	Sample Wt.	Solution Concentration µg/ml (1)	(2)	Average Sol'n Concentration	Soil Concentration µg/gram
C-1	SC 1(1,2) 0	10.0 g	<0.005		<0.005	<0.05
C-2	1(1,2) 10					
C-3	1(1,2) 0					
C-4	1(1,2) 10					
C-5	1(1,2) 0					
C-6	1(1,2) 10					
C-7	2(1,2) 0					
C-8	2(1,2) 10					
C-9	2(1,2) 0					
C-10	2(1,2) 10					
C-11	3(1,2) 0					
C-12	3(1,2) 10					
C-13	3(1,2) 0					
C-14	3(1,2) 10					
C-15	3(1,2) 0					
C-16	3(1,2) 10					
I-17	SI 1(1,2) 0					
I-18	1(1,2) 10					
I-19	1(1,2) 0					
I-20	1(1,2) 10					
I-21	1(1,2) 0					
I-22	1(1,2) 10					
I-23	2(1,2) 0					
I-24	2(1,2) 10					
I-25	2(1,2) 0					
I-26	2(1,2) 10					
I-27	3(1,2) 0					
I-28	3(1,2) 10					
I-29	3(1,2) 0					
I-30	3(1,2) 10					
I-31	3(1,2) 0					
I-32	3(1,2) 10					

Main Samples
New Mexico
Four Corners

Element: Arsenic — **Plants**

Sample No.	Location	Code	Sample Wt. g (1)	Sample Wt. g (2)	Solution Concentration µg/ml (1)	Solution Concentration µg/ml (2)	Average Sol'n Concentration	Plant Concentration µg/g	
PC 4	1	Lvs A	2.0	2.0	<0.02		<0.02	<1.0	x
PC 5	2	Lvs A			0.03	<0.02	0.03	1.5	
PC 6	3	Lvs A			0.025	<0.02	0.025	1.25	
PI 65	1	Lvs A		---	<0.02	---	<0.02	<1.0	
PI 63	2	Lvs A		2.0					
PI 64	3	Lvs A							
PC 7	1	Lvs C							x
PC 8	2	Lvs C		---		---			
PC 10	3	Lvs C		2.0					x
PI 67	1	Lvs C							
PI 66	2	Lvs C							
PI 68	3	Lvs C							
PC 1	1	Lvs G							
PC 2	2	Lvs G							
PC 3	3	Lvs G			0.072		0.072	3.6	
PI 44	1	Lvs G			<0.02		<0.02	<1.0	
PI 62	2	Lvs G							
PI 43	3	Lvs G							
PC 20	1	Plt L							
PC 22	2	Plt L							
PC 21	3	Plt L							
PI 71	1	Plt L	1.0	1.0		<0.02		<2.0	
PI 70	2	Plt L	1.0	1.0		<0.02			
PI 69	3	Plt L	1.0	1.0					
PC 16	3	Lvs W	2.0	---		---		<1.0	
PI	3	Lvs W	---	---	---	---	---	---	x
PC 17	3	Lvs S	2.0	---	<0.02	---	<0.02	<1.0	
PI 72	3	Lvs S	1.0	1.0	<0.02		<0.02	<2.0	
PC 18	3	Plt M	2.0	---	0.07	---	0.07	3.5	
PI 54	3	Plt M	1.0	1.0	0.076	0.083	0.080	8.0	
PC 19	2	Lvs Gs	2.0	---	<0.02	---	<0.02	<1.0	
PI 47	2	Lvs Gs	1.0	1.0	<0.02		<0.02	<2.0	
PC	1	Bk A	---	---	---	---	---	---	x
PC 14	2	Bk A	2.0	2.0	<0.02		<0.02	<1.0	
PC 15	3	Bk A	2.0	---		---	<0.02		
PI 52	1	Bk A	1.0	1.0			<0.02	<2.0	
PI 51	2	Bk A	1.0	1.0		<0.02	<0.02		
PI 53	3	Bk A	1.0	1.0			<0.02		

Main Samples
New Mexico
Four Corners

Element: Arsenic — Plant

Sample No.	Location Code	Sample Wt. g (1)	Sample Wt. g (2)	Solution Concentration µg/ml (1)	Solution Concentration µg/ml (2)	Average Sol'n Concentration	Plant Concentration µg/g
PC 11	1 Bk G	2.0	2.0	<0.02		<0.02	<1.0
PC 13	2 Bk G						
PC 12	3 Bk G						
PI 49	1 Bk G						
PI 50	2 Bk G						
PI 48	3 Bk G						
PC 27	1 Rts A						
PC 30	2 Rts A						
PC 29	3 Rts A						
PI 26	1 Rts A						
PI 25	2 Rts A						
PI 24	3 Rts A						
PC 34	1 Rts C	2.0	1.0				<2.0
PC 35	2 Rts C	0.5	1.0				
PC 36	3 Rts C	2.0	2.0				<1.0
PI 33	1 Rts C	0.5	0.5				<4.0
PI 32	2 Rts C	2.0	2.0				<1.0
PI 31	3 Rts C						
PC 42	1 Rts G						
PC 37	2 Rts G						
PC 38	3 Rts G						
PI 40	1 Rts G						
PI 39	2 Rts G	1.0	1.0				<2.0
PI 41	3 Rts G	2.0	2.0				<1.0
PC 57	3 Lic Gy	1.0	1.0				<2.0
PC 58	3 Lic Gn			0.022	<0.02	0.022	2.2
PC 59	3 Lic O			0.034	0.03	0.032	3.2
PI 60	1 Lic Gn			<0.02		<0.02	<2.0
PI 61	1 Lic O			0.034		0.034	3.4
PC 4 (2)	3 Lvs Ast.	2.0	2.0	<0.02		<0.02	<1.0
PI 46	3 Lvs Ast.	1.0	1.0	<0.02		<0.02	<2.0
Reagent Blank							
9				<0.02			
28							
45							
55							
73							

Main Samples
New Mexico
Four Corners

Element: Beryllium — Plants

Sample No.	Location Code	Sample Wt. g (1)	Sample Wt. g (2)	Solution Concentration µg/ml (1)	Solution Concentration µg/ml (2)	Average Sol'n Concentration	Plant Concentration µg/g	
PC 4	1 Lvs A	2.0	2.0	<0.0025	<0.0025	<0.0025	<0.125	x
PC 5	2 Lvs A			<0.0025	0.004	0.004	0.20	
PC 6	3 Lvs A			<0.0025	<0.0025	<0.0025	<0.125	
PI 65	1 Lvs A		---		---			
PI 63	2 Lvs A		2.0		<0.0025			
PI 64	3 Lvs A							
PC 7	1 Lvs C							x
PC 8	2 Lvs C		---		---			
PC 10	3 Lvs C		2.0		<0.0025			x
PI 67	1 Lvs C							
PI 66	2 Lvs C							
PI 68	3 Lvs C							
PC 1	1 Lvs G			0.003	0.003	0.003	0.15	
PC 2	2 Lvs G			<0.0025	<0.0025	<0.0025	<0.125	
PC 3	3 Lvs G							
PI 44	1 Lvs G							
PI 62	2 Lvs G							
PI 43	3 Lvs G							
PC 20	1 Plt L							
PC 22	2 Plt L							
PC 21	3 Plt L							
PI 71	1 Plt L	1.0	1.0				<0.250	
PI 70	2 Plt L	1.0	1.0				<0.250	
PI 69	3 Plt L	1.0	1.0				<0.250	
PC 16	3 Lvs W	2.0	---		---		<0.125	
PI	3 Lvs W	---	---	---	---	---	---	x
PC 17	3 Lvs S	2.0	---	<0.0025	---	<0.0025	<0.125	
PI 72	3 Lvs S	1.0	1.0		<0.0025		<0.250	
PC 18	3 Plt M	2.0	---	0.016	---	0.016	0.80	
PI 54	3 Plt M	1.0	1.0	0.021	0.021	0.021	2.1	
PC 19	2 Lvs Gs	2.0	---	<0.0025	<0.0025	<0.0025	<0.125	
PI 47	2 Lvs Gs	1.0	1.0		<0.0025		<0.250	
PC	1 Bk A	---	---	---	---	---	---	x
PC 14	2 Bk A	2.0	2.0	<0.0025	<0.0025	<0.0025	<0.125	
PC 15	3 Bk A	2.0	---		---			
PI 52	1 Bk A	1.0	1.0		<0.0025		<0.250	
PI 51	2 Bk A	1.0	1.0					
PI 53	3 Bk A	1.0	1.0					

Main Samples
New Mexico
Four Corners

Element: Beryllium — **Plant**

Sample No.	Location Code	Sample Wt. g (1)	Sample Wt. g (2)	Solution Concentration µg/ml (1)	Solution Concentration µg/ml (2)	Average Sol'n Concentration	Plant Concentration µg/g
PC 11	1 Bk G	2.0	2.0	<0.0025	<0.0025	<0.0025	<0.125
PC 13	2 Bk G	↓	↓	↓	↓	↓	↓
PC 12	3 Bk G						
PI 49	1 Bk G						
PI 50	2 Bk G						
PI 48	3 Bk G						
PC 27	1 Rts A						
PC 30	2 Rts A						
PC 29	3 Rts A						
PI 26	1 Rts A						
PI 25	2 Rts A						
PI 24	3 Rts A	↓	↓				
PC 34	1 Rts C	2.0	1.0				
PC 35	2 Rts C	0.5	1.0				<0.250
PC 36	3 Rts C	2.0	2.0				<0.125
PI 33	1 Rts C	0.5	0.5				<0.50
PI 32	2 Rts C	2.0	2.0				<0.125
PI 31	3 Rts C	↓	↓				↓
PC 42	1 Rts G						
PC 37	2 Rts G						
PC 38	3 Rts G						
PI 40	1 Rts G	↓	↓				
PI 39	2 Rts G	1.0	1.0				<0.250
PI 41	3 Rts G	2.0	2.0				<0.125
PC 57	3 Lic Gy	1.0	1.0	0.005	<0.0025	0.005	0.50
PC 58	3 Lic Gn	↓	↓	<0.0025	<0.0025	<0.0025	<0.250
PC 59	3 Lic O			↓	↓	↓	↓
PI 60	1 Lic Gn						
PI 61	1 Lic O	↓	↓		0.004	0.004	0.4
PC 4 (2)	3 Lvs Ast.	2.0	2.0	0.004	0.0025	0.003	0.15
PI 46	3 Lvs Ast.	1.0	1.0	<0.0025	<0.0025	<0.0025	<0.250
Reagent Blank							
9				<0.0025			
28				↓			
45							
55							
73							

Main Samples
New Mexico
Four Corners

Element: Cadmium — Plants

Sample No.	Location Code	Sample Wt. g (1)	Sample Wt. g (2)	Solution Concentration µg/ml (1)	Solution Concentration µg/ml (2)	Average Sol'n Concentration	Plant Concentration µg/g	
PC 4	1 Lvs A	2.0	2.0	<0.0025	<0.0025	<0.0025	<0.125	x
PC 5	2 Lvs A			0.005	0.0037	0.0043	0.215	
PC 6	3 Lvs A			<0.0025	<0.0025	<0.0025	<0.125	
PI 65	1 Lvs A		---	0.0031	---	0.003	0.15	
PI 63	2 Lvs A		2.0	0.0043	0.0053	0.005	0.25	
PI 64	3 Lvs A			0.0132	0.0115	0.0123	0.62	
PC 7	1 Lvs C			<0.0025	<0.0025	<0.0025	<0.125	x
PC 8	2 Lvs C		---	0.003	---	0.003	0.150	
PC 10	3 Lvs C		2.0	<0.0025	<0.0025	<0.0025	<0.125	x
PI 67	1 Lvs C			0.0027	<0.0025	0.0027	0.14	
PI 66	2 Lvs C			0.0051	0.0083	0.0067	0.34	
PI 68	3 Lvs C			0.004	0.0166	0.0086	0.43	
PC 1	1 Lvs G			0.0027	<0.0025	0.0027	0.135	
PC 2	2 Lvs G			<0.0025	0.0025	0.0025	0.125	
PC 3	3 Lvs G			0.007	<0.0025	0.007	0.35	
PI 44	1 Lvs G			<0.0025	<0.0025	<0.0025	<0.125	
PI 62	2 Lvs G			0.009	<0.0025	0.009	0.45	
PI 43	3 Lvs G			<0.0025	<0.0025	<0.0025	<0.125	
PC 20	1 Plt L			<0.0025	<0.0025	<0.0025	<0.125	
PC 22	2 Plt L			0.0152	0.003	0.008	0.40	
PC 21	3 Plt L			0.0103	0.008	0.009	0.45	
PI 71	1 Plt L	1.0	1.0	0.0097	0.0098	0.0098	0.98	
PI 70	2 Plt L	1.0	1.0	0.0035	0.006	0.0048	0.48	
PI 69	3 Plt L	1.0	1.0	<0.0025	<0.0025	<0.0025	<0.25	
PC 16	3 Lvs W	2.0	---	<0.0025	---	<0.0025	<0.125	
PI	3 Lvs W	---	---	---	---	---	---	x
PC 17	3 Lvs S	2.0	---	<0.0025	---	<0.0025	<0.125	
PI 72	3 Lvs S	1.0	1.0	<0.0025	<0.0025	<0.0025	<0.25	
PC 18	3 Plt M	2.0	---	<0.0025	---	<0.0025	<0.125	
PI 54	3 Plt M	1.0	1.0	0.003	0.003	0.003	0.3	
PC 19	2 Lvs Gs	2.0	---	<0.0025	---	<0.0025	<0.125	
PI 47	2 Lvs Gs	1.0	1.0	0.0025	0.010	0.0063	0.63	
PC	1 Bk A	---	---	---	---	---	---	x
PC 14	2 Bk A	2.0	2.0	<0.0025	<0.0025	<0.0025	<0.125	
PC 15	3 Bk A	2.0	---	0.0082	---	0.0082	0.41	
PI 52	1 Bk A	1.0	1.0	0.007	0.007	0.007	0.70	
PI 51	2 Bk A	1.0	1.0	0.0095	0.0072	0.0084	0.84	
PI 53	3 Bk A	1.0	1.0	0.0187	0.0206	0.0197	1.97	

Main Samples
New Mexico
Four Corners

Element: Cadmium

Plant

Sample No.	Location Code	Sample Wt. g (1)	Sample Wt. g (2)	Solution Concentration µg/ml (1)	Solution Concentration µg/ml (2)	Average Sol'n Concentration	Plant Concentration µg/g
PC 11	1 Bk G	2.0	2.0	<0.0025	<0.0025	<0.0025	<0.125
PC 13	2 Bk G	↓	↓	↓	↓	↓	↓
PC 12	3 Bk G	↓	↓	↓	↓	↓	↓
PI 49	1 Bk G	↓	↓	0.006	0.006	0.006	0.3
PI 50	2 Bk G	↓	↓	0.006	0.003	0.0045	0.23
PI 48	3 Bk G	↓	↓	0.0025	0.0027	0.0026	0.13
PC 27	1 Rts A	↓	↓	<0.0025	<0.0025	<0.0025	<0.125
PC 30	2 Rts A	↓	↓	↓	↓	↓	↓
PC 29	3 Rts A	↓	↓	↓	↓	↓	↓
PI 26	1 Rts A	↓	↓	↓	↓	↓	↓
PI 25	2 Rts A	↓	↓	0.005	0.006	0.0055	0.275
PI 24	3 Rts A	↓	↓	<0.0025	<0.0025	<0.0025	<0.125
PC 34	1 Rts C	2.0	1.0	↓	↓	↓	↓
PC 35	2 Rts C	0.5	1.0	↓	↓	↓	<0.25
PC 36	3 Rts C	2.0	2.0	↓	↓	↓	<0.125
PI 33	1 Rts C	0.5	0.5	<0.0025	<0.0025	<0.0025	<0.5
PI 32	2 Rts C	2.0	2.0	↓	↓	↓	<0.125
PI 31	3 Rts C	↓	↓	↓	↓	↓	↓
PC 42	1 Rts G	↓	↓	↓	↓	↓	↓
PC 37	2 Rts G	↓	↓	↓	↓	↓	↓
PC 38	3 Rts G	↓	↓	↓	↓	↓	↓
PI 40	1 Rts G	↓	↓	↓	↓	↓	↓
PI 39	2 Rts G	1.0	1.0	↓	↓	↓	<0.25
PI 41	3 Rts G	2.0	2.0	↓	↓	↓	<0.125
PC 57	3 Lic Gy	1.0	1.0	0.0105	<0.0025	0.0105	1.05
PC 58	3 Lic Gn	↓	↓	0.004	0.0065	0.0053	0.53
PC 59	3 Lic O	↓	↓	0.0077	<0.0025	0.0077	0.77
PI 60	1 Lic Gn	↓	↓	0.005	0.0096	0.0073	0.073
PI 61	1 Lic O	↓	↓	0.0071	<0.0025	0.0071	0.71
PC 4 (2)	3 Lvs Ast.	2.0	2.0	0.0075	<0.0025	0.0075	0.375
PI 46	3 Lvs Ast.	1.0	1.0	<0.0025	<0.0025	<0.0025	<0.25
Reagent Blank							
9				<0.0025			
28				↓			
45				↓			
55				↓			
73				↓			

Main Samples
New Mexico
Four Corners

Element: Chromium

Plants

Sample No.	Location Code	Sample Wt. g (1)	Sample Wt. g (2)	Solution Concentration µg/ml (1)	Solution Concentration µg/ml (2)	Average Sol'n Concentration	Plant Concentration µg/g	
PC 4	1 Lvs A	2.0	2.0	0.090	0.075	0.083	4.15	x
PC 5	2 Lvs A			0.023	0.045	0.034	1.70	
PC 6	3 Lvs A			0.023	0.030	0.027	1.35	
PI 65	1 Lvs A		---	0.050	---	0.050	2.5	
PI 63	2 Lvs A		2.0	0.052	0.050	0.051	2.05	
PI 64	3 Lvs A			0.050	0.060	0.055	2.25	
PC 7	1 Lvs C			0.035	0.025	0.030	1.5	x
PC 8	2 Lvs C		---	0.020	---	0.020	1.0	
PC 10	3 Lvs C		2.0	0.065	0.072	0.069	3.5	x
PI 67	1 Lvs C			0.052	0.045	0.049	2.5	
PI 66	2 Lvs C			0.062	0.073	0.068	3.4	
PI 68	3 Lvs C			0.037	0.060	0.049	2.5	
PC 1	1 Lvs G			0.020	0.014	0.017	0.85	
PC 2	2 Lvs G			0.014	0.010	0.012	0.60	
PC 3	3 Lvs G			<0.01	<0.01	<0.01	<0.5	
PI 44	1 Lvs G			0.033	0.032	0.033	1.65	
PI 62	2 Lvs G			0.055	0.052	0.054	2.66	
PI 43	3 Lvs G			0.048	0.020	0.034	1.70	
PC 20	1 Plt L			0.035	0.050	0.0425	2.12	
PC 22	2 Plt L			0.065	0.080	0.073	3.65	
PC 21	3 Plt L			0.048	0.048	0.048	2.4	
PI 71	1 Plt L	1.0	1.0	0.037	0.035	0.036	3.6	
PI 70	2 Plt L	1.0	1.0	0.036	0.036	0.036	3.6	
PI 69	3 Plt L	1.0	1.0	0.023	0.033	0.028	2.8	
PC 16	3 Lvs W	2.0	---	0.070	---	0.070	3.5	
PI	3 Lvs W	---	---	---	---	---	---	x
PC 17	3 Lvs S	2.0	---	0.052	---	0.052	2.6	
PI 72	3 Lvs S	1.0	1.0	0.035	0.052	0.044	4.4	
PC 18	3 Plt M	2.0	---	0.413	---	0.413	20.65	
PI 54	3 Plt M	1.0	1.0	0.536	0.517	0.527	52.7	
PC 19	2 Lvs Gs	2.0	---	0.052	---	0.052	2.6	
PI 47	2 Lvs Gs	1.0	1.0	<0.01	0.015	0.015	1.5	
PC	1 Bk A	---	---	---	---	---	---	x
PC 14	2 Bk A	2.0	2.0	0.088	0.075	0.082	4.1	
PC 15	3 Bk A	2.0	---	0.074	---	0.074	3.7	
PI 52	1 Bk A	1.0	1.0	0.030	0.032	0.032	3.2	
PI 51	2 Bk A	1.0	1.0	0.033	0.030	0.032	3.2	
PI 53	3 Bk A	1.0	1.0	0.043	0.043	0.043	4.3	

Main Samples
New Mexico
Four Corners

Element: Chromium

Sample No.	Location Code	Sample Wt. g (1)	Sample Wt. g (2)	Solution Concentration µg/ml (1)	Solution Concentration µg/ml (2)	Average Sol'n Concentration	Plant Concentration µg/g
							Plant
PC 11	1 Bk G	2.0	2.0	0.050	0.050	0.050	2.5
PC 13	2 Bk G	↓	↓	0.060	0.043	0.052	2.6
PC 12	3 Bk G	↓	↓	0.040	0.040	0.040	2.0
PI 49	1 Bk G	↓	↓	0.043	0.043	0.043	2.15
PI 50	2 Bk G	↓	↓	0.045	0.032	0.039	1.95
PI 48	3 Bk G	↓	↓	0.035	0.052	0.044	2.18
PC 27	1 Rts A	↓	↓	0.054	0.057	0.056	2.78
PC 30	2 Rts A	↓	↓	0.052	0.070	0.061	3.05
PC 29	3 Rts A	↓	↓	0.040	0.050	0.045	2.25
PI 26	1 Rts A	↓	↓	0.050	0.043	0.046	2.3
PI 25	2 Rts A	↓	↓	0.045	0.052	0.049	2.5
PI 24	3 Rts A	↓	↓	0.054	0.050	0.052	2.6
PC 34	1 Rts C	2.0	1.0	0.110	0.023	0.078	3.9
PC 35	2 Rts C	0.5	1.0	0.014	0.033	0.030	3.0
PC 36	3 Rts C	2.0	2.0	0.048	0.043	0.045	2.25
PI 33	1 Rts C	0.5	0.5	0.014	0.032	0.023	4.6
PI 32	2 Rts C	2.0	2.0	0.090	0.075	0.083	4.15
PI 31	3 Rts C	↓	↓	0.065	0.060	0.063	3.15
PC 42	1 Rts G	↓	↓	0.023	0.033	0.028	1.4
PC 37	2 Rts G	↓	↓	0.043	0.016	0.029	1.45
PC 38	3 Rts G	↓	↓	0.025	0.022	0.024	1.2
PI 40	1 Rts G	↓	↓	0.037	0.025	0.031	1.5
PI 39	2 Rts G	1.0	1.0	0.033	0.050	0.042	4.2
PI 41	3 Rts G	2.0	2.0	0.014	0.030	0.022	1.1
PC 57	3 Lic Gy	1.0	1.0	0.149	0.094	0.122	12.2
PC 58	3 Lic Gn	↓	↓	0.075	0.052	0.064	6.4
PC 59	3 Lic O	↓	↓	0.182	0.172	0.187	18.7
PI 60	1 Lic Gn	↓	↓	0.055	0.036	0.046	4.6
PI 61	1 Lic O	↓	↓	0.060	0.159	0.110	11.0
PC 4 (2)	3 Lvs Ast.	2.0	2.0	0.033	0.030	0.032	1.61
PI 46	3 Lvs Ast.	1.0	1.0	<0.01	0.025	0.025	2.5
Reagent Blank							
9				<0.01			
28				<0.01			
45				<0.01			
55				<0.01			
73				<0.01			

Main Samples
New Mexico
Four Corners

Element: Lead — Plants

Sample No.	Location Code	Sample Wt. g (1)	Sample Wt. g (2)	Solution Concentration µg/ml (1)	Solution Concentration µg/ml (2)	Average Sol'n Concentration	Plant Concentration µg/g	
PC 4	1 Lvs A	2.0	2.0	<0.1	<0.1	<0.1	<5.0	x
PC 5	2 Lvs A							
PC 6	3 Lvs A							
PI 65	1 Lvs A		---		---			
PI 63	2 Lvs A		2.0		<0.01			
PI 64	3 Lvs A							
PC 7	1 Lvs C							x
PC 8	2 Lvs C		---		---			
PC 10	3 Lvs C		2.0		0.01			x
PI 67	1 Lvs C							
PI 66	2 Lvs C							
PI 68	3 Lvs C							
PC 1	1 Lvs G							
PC 2	2 Lvs G							
PC 3	3 Lvs G							
PI 44	1 Lvs G							
PI 62	2 Lvs G							
PI 43	3 Lvs G							
PC 20	1 Plt L							
PC 22	2 Plt L							
PC 21	3 Plt L							
PI 71	1 Plt L	1.0	1.0				<10.0	
PI 70	2 Plt L	1.0	1.0					
PI 69	3 Plt L	1.0	1.0					
PC 16	3 Lvs W	2.0	---		---		<5.0	
PI	3 Lvs W	---	---	---	---	---	---	x
PC 17	3 Lvs S	2.0	---	<0.1	---	<0.1	<5.0	
PI 72	3 Lvs S	1.0	1.0		<0.1		<10.0	
PC 18	3 Plt M	2.0	---		---		<5.0	
PI 54	3 Plt M	1.0	1.0		<0.1		<10.0	
PC 19	2 Lvs Gs	2.0	---		---		<5.0	
PI 47	2 Lvs Gs	1.0	1.0		<0.1		<10.0	
PC	1 Bk A	---	---	---	---	---	---	x
PC 14	2 Bk A	2.0	2.0	<0.1	<0.01	<0.1	<5.0	
PC 15	3 Bk A	2.0	---		---			
PI 52	1 Bk A	1.0	1.0		<0.1		<10.0	
PI 51	2 Bk A	1.0	1.0					
PI 53	3 Bk A	1.0	1.0					

Main Samples
New Mexico
Four Corners

Element: Lead

Plant

Sample No.	Location Code	Sample Wt. g (1)	Sample Wt. g (2)	Solution Concentration µg/ml (1)	Solution Concentration µg/ml (2)	Average Sol'n Concentration	Plant Concentration µg/g
PC 11	1 Bk G	2.0	2.0	<0.1	<0.1	<0.1	<5.0
PC 13	2 Bk G						
PC 12	3 Bk G						
PI 49	1 Bk G						
PI 50	2 Bk G						
PI 48	3 Bk G						
PC 27	1 Rts A						
PC 30	2 Rts A						
PC 29	3 Rts A						
PI 26	1 Rts A						
PI 25	2 Rts A						
PI 24	3 Rts A						
PC 34	1 Rts C	2.0	1.0				<10.0
PC 35	2 Rts C	0.5	1.0				<5.0
PC 36	3 Rts C	2.0	2.0				<20.0
PI 33	1 Rts C	0.5	0.5				<5.0
PI 32	2 Rts C	2.0	2.0				
PI 31	3 Rts C						
PC 42	1 Rts G						
PC 37	2 Rts G						
PC 38	3 Rts G						
PI 40	1 Rts G						
PI 39	2 Rts G	1.0	1.0				<10.0
PI 41	3 Rts G	2.0	2.0				<5.0
PC 57	3 Lic Gy	1.0	1.0				<10.0
PC 58	3 Lic Gn						
PC 59	3 Lic O						
PI 60	1 Lic Gn						
PI 61	1 Lic O						
PC 4 (2)	3 Lvs Ast.	2.0	2.0				<5.0
PI 46	3 Lvs Ast.	1.0	1.0				<10.0
Reagent Blank							
9				<0.1			
28							
45							
55							
73							

Main Samples
New Mexico
Four Corners

Element: Manganese — Plants

Sample No.	Location Code	Sample Wt. g (1)	Sample Wt. g (2)	Solution Concentration µg/ml (1)	Solution Concentration µg/ml (2)	Average Sol'n Concentration	Plant Concentration µg/g	
PC 4	1 Lvs A	2.0	2.0	1.68	1.68	1.68	84.0	x
PC 5	2 Lvs A			3.01	4.07	3.54	177	
PC 6	3 Lvs A			1.72	1.71	1.72	86.0	
PI 65	1 Lvs A		---	2.30	---	2.30	115	
PI 63	2 Lvs A		2.0	1.47	1.50	1.49	74.5	
PI 64	3 Lvs A			2.18	2.18	2.18	109	
PC 7	1 Lvs C			1.05	1.04	1.05	45.5	x
PC 8	2 Lvs C		---	1.29	---	1.29	64.5	
PC 10	3 Lvs C		2.0	1.00	1.03	1.015	50.8	x
PI 67	1 Lvs C			1.49	1.46	1.475	73.8	
PI 66	2 Lvs C			1.15	1.14	1.15	57.5	
PI 68	3 Lvs C			0.78	0.77	0.78	39.0	
PC 1	1 Lvs G			4.07	3.98	4.02	201	
PC 2	2 Lvs G			2.48	2.60	2.54	127	
PC 3	3 Lvs G			3.35	3.35	3.35	167.5	
PI 44	1 Lvs G			4.72	4.85	4.78	239	
PI 62	2 Lvs G			4.66	4.66	4.66	233	
PI 43	3 Lvs G			4.18	4.17	4.18	209	
PC 20	1 Plt L			0.50	0.52	0.51	25.5	
PC 22	2 Plt L			0.71	0.67	0.69	34.5	
PC 21	3 Plt L			0.64	0.66	0.65	32.5	
PI 71	1 Plt L	1.0	1.0	0.21	0.22	0.22	22	
PI 70	2 Plt L	1.0	1.0	0.33	0.30	0.32	32	
PI 69	3 Plt L	1.0	1.0	0.19	0.18	0.185	18.5	
PC 16	3 Lvs W	2.0	---	3.67	---	3.67	183.5	
PI	3 Lvs W	---	---	---	---	---	---	x
PC 17	3 Lvs S	2.0	---	1.57	---	1.57	73.5	
PI 72	3 Lvs S	1.0	1.0	0.85	0.97	0.91	91.0	
PC 18	3 Plt M	2.0	---	7.49	---	7.49	374.5	
PI 54	3 Plt M	1.0	1.0	6.60	6.25	6.42	642	
PC 19	2 Lvs Gs	2.0	---	1.41	---	1.41	72.1	
PI 47	2 Lvs Gs	1.0	1.0	0.46	0.44	0.45	45	
PC	1 Bk A	---	---	---	---	---	---	x
PC 14	2 Bk A	2.0	2.0	3.02	3.54	3.23	161.5	
PC 15	3 Bk A	2.0	---	2.82	---	2.82	141	
PI 52	1 Bk A	1.0	1.0	1.02	1.05	1.03	103	
PI 51	2 Bk A	1.0	1.0	1.13	1.15	1.14	114	
PI 53	3 Bk A	1.0	1.0	1.57	1.50	1.53	153	

Main Samples
New Mexico
Four Corners

Element: Manganese — Plant

Sample No.	Location Code	Sample Wt. g (1)	Sample Wt. g (2)	Solution Concentration µg/ml (1)	Solution Concentration µg/ml (2)	Average Sol'n Concentration	Plant Concentration µg/g
PC 11	1 Bk G	2.0	2.0	1.90	1.75	1.825	91.5
PC 13	2 Bk G	↓	↓	4.72	4.15	4.43	221.5
PC 12	3 Bk G	↓	↓	2.58	2.17	2.38	119
PI 49	1 Bk G	↓	↓	3.21	3.01	3.10	155
PI 50	2 Bk G	↓	↓	4.15	3.07	3.61	180.5
PI 48	3 Bk G	↓	↓	2.02	2.19	2.11	105.5
PC 27	1 Rts A	↓	↓	1.99	1.87	1.93	96.5
PC 30	2 Rts A	↓	↓	2.74	2.82	2.78	139
PC 29	3 Rts A	↓	↓	4.83	4.52	4.68	234
PI 26	1 Rts A	↓	↓	1.84	1.86	1.85	92.5
PI 25	2 Rts A	↓	↓	1.29	1.23	1.26	63
PI 24	3 Rts A	↓	↓	1.47	1.55	1.51	75.5
PC 34	1 Rts C	2.0	1.0	0.72	0.40	0.76	38
PC 35	2 Rts C	0.5	1.0	0.22	0.50	0.47	47
PC 36	3 Rts C	2.0	2.0	0.90	0.96	0.93	46.5
PI 33	1 Rts C	0.5	0.5	0.18	0.20	0.19	38
PI 32	2 Rts C	2.0	2.0	0.69	0.75	0.72	31
PI 31	3 Rts C	↓	↓	0.75	0.68	0.715	35.8
PC 42	1 Rts G	↓	↓	2.60	2.61	2.61	130.5
PC 37	2 Rts G	↓	↓	1.89	1.86	1.88	94
PC 38	3 Rts G	↓	↓	2.28	2.26	2.27	113.5
PI 40	1 Rts G	↓	↓	2.02	2.05	2.03	101.5
PI 39	2 Rts G	1.0	1.0	1.35	1.44	1.40	140
PI 41	3 Rts G	2.0	2.0	1.36	1.38	1.37	68.5
PC 57	3 Lic Gy	1.0	1.0	1.0	1.51	1.25	125
PC 58	3 Lic Gn	↓	↓	0.79	0.87	0.83	83
PC 59	3 Lic O	↓	↓	1.51	1.56	1.53	153
PI 60	1 Lic Gn	↓	↓	0.64	0.81	0.72	72
PI 61	1 Lic O	↓	↓	1.42	1.45	1.44	144
PC 4 (2)	3 Lvs Ast.	2.0	2.0	1.55	1.56	1.56	78
PI 46	3 Lvs Ast.	1.0	1.0	0.92	0.92	0.92	92
Reagent Blank 9				<0.1			
28				↓			
45							
55							
73							

Main Samples
New Mexico
Four Corners

Element: Mercury

Plants

Sample No.	Location	Code	Sample Wt. g (1)	Sample Wt. g (2)	Concentration µg/mg (1)	Concentration µg/mg (2)	Plant Concentration µg/g
PC 4	1	Lvs A	0.5	0.5	<0.02	0.02	0.02
PC 5	2	Lvs A			0.02	0.04	0.03
PC 6	3	Lvs A			<0.02	0.02	<0.02
PI 65	1	Lvs A				0.08	0.08
PI 63	2	Lvs A				0.08	0.08
PI 64	3	Lvs A			0.02	0.08	0.05
PC 7	1	Lvs C			<0.02	<0.02	<0.02
PC 8	2	Lvs C		---	0.09	---	0.09
PC 10	3	Lvs C		0.5	0.02	<0.02	0.02
PI 67	1	Lvs C		---	0.06	---	0.06
PI 66	2	Lvs C		0.5	0.02	0.06	0.04
PI 68	3	Lvs C			0.10	0.04	0.07
PC 1	1	Lvs G			<0.02	0.02	0.02
PC 2	2	Lvs G			<0.02	<0.02	<0.02
PC 3	3	Lvs G					<0.02
PI 44	1	Lvs G				0.08	0.08
PI 62	2	Lvs G		---	0.06	---	0.06
PI 43	3	Lvs G		0.5	0.12	0.08	0.10
PC 20	1	Plt L		---	0.09	---	0.09
PC 22	2	Plt L	---	---	---	---	---
PC 23	3	Plt L	---	---	---	---	---
PI 71	1	Plt L	0.5	0.5	0.02	0.08	0.05
PI 70	2	Plt L			0.02	0.04	0.03
PI 69	3	Plt L			0.02	0.06	0.04
PC 16	3	Lvs W			0.08	0.03	0.06
PI	3	Lvs W	---	---	---	---	---
PC 17	3	Lvs S	0.5	---	0.13	---	0.13
PI 72	3	Lvs S		0.5	<0.02	0.02	0.02
PC 18	3	Plt M			0.02	0.04	0.03
PI 54	3	Plt M		---	0.04	---	0.04
PC 19	2	Lvs Gs		---	0.10	---	0.10
PI 47	2	Lvs Gs		0.5	0.02	0.18	0.10
PC	1	Bk A	---	---	---	---	---
PC 14	2	Bk A	---	---	---	---	---
PC 15	3	Bk A	0.5	---	0.03	---	0.03
PI 52	1	Bk A		0.5	<0.02	<0.02	<0.02
PI 51	2	Bk A				0.04	0.04
PI 53	3	Bk A			0.02	0.06	0.04

Main Samples
New Mexico
Four Corners

Element: Mercury

Plant

Sample No.	Location Code	Sample Wt. g (1)	Sample Wt. g (2)	Concentration µg/mg (1)	Concentration µg/mg (2)	Plant Concentration µg/g
PC 11	1 Bk G	0.5	---	0.06	---	0.06
PC 13	2 Bk G		0.5	<0.02	0.02	0.02
PC 12	3 Bk G		---	0.04	---	0.04
PI 49	1 Bk G		0.5	<0.02	0.04	0.04
PI 50	2 Bk G		---	0.08	---	0.08
PI 48	3 Bk G		0.5	0.02	0.08	0.06
PC 27	1 Rts A			0.02	0.02	0.02
PC 30	2 Rts A			0.02	0.10	0.06
PC 29	3 Rts A			0.02	<0.02	0.02
PI 26	1 Rts A			<0.02	0.02	0.02
PI 25	2 Rts A				<0.02	<0.02
PI 24	3 Rts A			0.02	<0.02	0.02
PC 34	1 Rts C		---	0.05	---	0.05
PC 35	2 Rts C	---	---	0.06	---	0.06
PC 36	3 Rts C	0.1	---	<0.08	---	<0.08
PI 33	1 Rts C	0.5	---	0.06	---	0.06
PI 32	2 Rts C		---	0.08	---	0.08
PI 31	3 Rts C		0.5	0.02	0.06	0.04
PC 42	1 Rts G			0.02	0.06	0.04
PC 37	2 Rts G					0.04
PC 38	3 Rts G			<0.02	0.04	0.04
PI 40	1 Rts G			<0.02	0.10	0.10
PI 39	2 Rts G		---	0.08	---	0.08
PI 41	3 Rts G		0.5	0.02	<0.02	0.02
PC 57	3 Lic Gy		---	0.08	---	0.08
PC 58	3 Lic Gn		---	0.18	---	0.18
PC 59	3 Lic O		---	0.08	---	0.08
PI 60	1 Lic Gn		0.5	0.14	0.14	0.14
PI 61	1 Lic O		0.5	0.06	0.06	0.06
PC 4 (2)	3 Lvs Ast.	---	---	---	---	---
PI 46	3 Lvs Ast.	0.5	0.5	0.02	0.16	0.09

Main Samples
New Mexico
Four Corners

Element: Molybdenum

Plants

Sample No.	Location Code	Sample Wt. g (1)	Sample Wt. g (2)	Solution Concentration µg/ml (1)	Solution Concentration µg/ml (2)	Average Sol'n Concentration	Plant Concentration µg/g	
PC 4	1 Lvs A	2.0	2.0	<0.05	<0.05	<0.05	<2.5	x
PC 5	2 Lvs A							
PC 6	3 Lvs A							
PI 65	1 Lvs A		---		---			
PI 63	2 Lvs A		2.0					
PI 64	3 Lvs A							
PC 7	1 Lvs C							x
PC 8	2 Lvs C		---		---			
PC 10	3 Lvs C		2.0					x
PI 67	1 Lvs C							
PI 66	2 Lvs C							
PI 68	3 Lvs C							
PC 1	1 Lvs G							
PC 2	2 Lvs G							
PC 3	3 Lvs G							
PI 44	1 Lvs G							
PI 62	2 Lvs G							
PI 43	3 Lvs G							
PC 20	1 Plt L							
PC 22	2 Plt L			0.11	0.11	0.11	5.5	
PC 21	3 Plt L			<0.05	<0.05	<0.05	<2.5	
PI 71	1 Plt L	1.0	1.0				<5.0	
PI 70	2 Plt L	1.0	1.0					
PI 69	3 Plt L	1.0	1.0					
PC 16	3 Lvs W	2.0	---		---		<2.5	
PI	3 Lvs W	---	---	---	---	---	---	x
PC 17	3 Lvs S	2.0	---	<0.05	---	<0.05	<2.5	
PI 72	3 Lvs S	1.0	1.0		<0.05		<5.0	
PC 18	3 Plt M	2.0	---		---		<2.5	
PI 54	3 Plt M	1.0	1.0		<0.05		<5.0	
PC 19	2 Lvs Gs	2.0	---		---		<2.5	
PI 47	2 Lvs Gs	1.0	1.0		<0.05		<5.0	
PC	1 Bk A	---	---	---	---	---	---	x
PC 14	2 Bk A	2.0	2.0	<0.05	<0.05	<0.05	<2.5	
PC 15	3 Bk A	2.0	---		---		<5.0	
PI 52	1 Bk A	1.0	1.0		<0.05			
PI 51	2 Bk A	1.0	1.0					
PI 53	3 Bk A	1.0	1.0					

Main Samples
New Mexico
Four Corners

Element: Molybdenum

Plant

Sample No.	Location Code	Sample Wt. g (1)	Sample Wt. g (2)	Solution Concentration µg/ml (1)	Solution Concentration µg/ml (2)	Average Sol'n Concentration	Plant Concentration µg/g
PC 11	1 Bk G	2.0	2.0	<0.05	<0.05	<0.05	<2.5
PC 13	2 Bk G						
PC 12	3 Bk G						
PI 49	1 Bk G						
PI 50	2 Bk G						
PI 48	3 Bk G						
PC 27	1 Rts A						
PC 30	2 Rts A						
PC 29	3 Rts A						
PI 26	1 Rts A						
PI 25	2 Rts A						
PI 24	3 Rts A						
PC 34	1 Rts C	2.0	1.0				
PC 35	2 Rts C	0.5	1.0				<5.0
PC 36	3 Rts C	2.0	2.0				<2.5
PI 33	1 Rts C	0.5	0.5				<10.0
PI 32	2 Rts C	2.0	2.0				<2.5
PI 31	3 Rts C						
PC 42	1 Rts G						
PC 37	2 Rts G						
PC 38	3 Rts G						
PI 40	1 Rts G				0.075	0.075	3.75
PI 39	2 Rts G	1.0	1.0		<0.05	<0.05	<5.0
PI 41	3 Rts G	2.0	2.0				<2.5
PC 57	3 Lic Gy	1.0	1.0		0.15	0.15	15.0
PC 58	3 Lic Gn				0.23	0.23	23.0
PC 59	3 Lic O				<0.05	<0.05	<5.0
PI 60	1 Lic Gn						
PI 61	1 Lic O						
PC 4 (2)	3 Lvs Ast.	2.0	2.0				<2.5
PI 46	3 Lvs Ast.	1.0	1.0	0.16	0.13	0.15	15.0
Reagent Blank 9				<0.05			
28							
45							
55							
73							

Main Samples
New Mexico
Four Corners

Element: Nickel — Plants

Sample No.	Location Code	Sample Wt. g (1)	Sample Wt. g (2)	Solution Concentration µg/ml (1)	Solution Concentration µg/ml (2)	Average Sol'n Concentration	Plant Concentration µg/g	
PC 4	1 Lvs A	2.0	2.0	0.046	0.05	0.048	2.4	x
PC 5	2 Lvs A			0.012	0.028	0.020	1.0	
PC 6	3 Lvs A			0.030	0.042	0.036	1.8	
PI 65	1 Lvs A		---	0.082	---	0.082	4.1	
PI 63	2 Lvs A		2.0	0.078	0.077	0.078	3.9	
PI 64	3 Lvs A			0.090	0.080	0.085	4.25	
PC 7	1 Lvs C			0.022	0.023	0.023	1.15	x
PC 8	2 Lvs C		---	0.017	---	0.017	0.85	
PC 10	3 Lvs C		2.0	0.053	0.058	0.0555	2.78	x
PI 67	1 Lvs C			0.068	0.066	0.067	3.35	
PI 66	2 Lvs C			0.062	0.087	0.075	3.75	
PI 68	3 Lvs C			0.078	0.065	0.072	3.6	
PC 1	1 Lvs G			0.038	0.017	0.028	1.4	
PC 2	2 Lvs G			0.015	<0.01	0.015	0.75	
PC 3	3 Lvs G			<0.01		<0.01	<0.5	
PI 44	1 Lvs G			0.015	0.025	0.020	1.0	
PI 62	2 Lvs G			0.142	0.058	0.100	5.0	
PI 43	3 Lvs G			0.022	0.022	0.022	1.1	
PC 20	1 Plt L			0.049	0.038	0.044	2.2	
PC 22	2 Plt L			0.063	0.067	0.065	3.25	
PC 21	3 Plt L			0.063	0.046	0.055	2.25	
PI 71	1 Plt L	1.0	1.0	0.035	0.041	0.038	3.8	
PI 70	2 Plt L	1.0	1.0	0.027	0.043	0.035	3.5	
PI 69	3 Plt L	1.0	1.0	0.035	0.035	0.035	3.5	
PC 16	3 Lvs W	2.0	---	0.067	---	0.067	3.35	
PI	3 Lvs W	---	---	---	---	---	---	x
PC 17	3 Lvs S	2.0	---	0.053	---	0.053	2.65	
PI 72	3 Lvs S	1.0	1.0	0.055	0.055	0.055	5.5	
PC 18	3 Plt M	2.0	---	0.238	---	0.238	11.9	
PI 54	3 Plt M	1.0	1.0	0.225	0.212	0.218	21.8	
PC 19	2 Lvs Gs	2.0	---	0.045	---	0.045	2.25	
PI 47	2 Lvs Gs	1.0	1.0	<0.01	0.02	0.02	2.0	
PC	1 Bk A	---	---	---	---	---	---	x
PC 14	2 Bk A	2.0	2.0	0.115	0.120	0.118	5.9	
PC 15	3 Bk A	2.0	---	0.061	---	0.061	3.05	
PI 52	1 Bk A	1.0	1.0	0.017	<0.01	0.017	1.7	
PI 51	2 Bk A	1.0	1.0	0.016	0.011	0.0135	1.35	
PI 53	3 Bk A	1.0	1.0	<0.01	<0.01	<0.01	<1.0	

Main Samples
New Mexico
Four Corners

Element: Nickel — Plant

Sample No.	Location Code	Sample Wt. g (1)	Sample Wt. g (2)	Solution Concentration µg/ml (1)	Solution Concentration µg/ml (2)	Average Sol'n Concentration	Plant Concentration µg/g
PC 11	1 Bk G	2.0	2.0	0.047	0.034	0.041	2.05
PC 13	2 Bk G			0.065	0.066	0.066	3.3
PC 12	3 Bk G			0.055	0.040	0.048	2.4
PI 49	1 Bk G			0.011	0.022	0.0165	0.83
PI 50	2 Bk G			0.011	0.012	0.012	0.6
PI 48	3 Bk G			0.011	0.02	0.015	0.75
PC 27	1 Rts A			0.063	0.072	0.068	3.4
PC 30	2 Rts A			0.067	0.083	0.075	3.75
PC 29	3 Rts A			0.034	0.033	0.034	1.7
PI 26	1 Rts A			0.075	0.071	0.073	3.65
PI 25	2 Rts A			0.058	0.061	0.060	3.0
PI 24	3 Rts A			0.030	0.063	0.0465	2.33
PC 34	1 Rts C	2.0	1.0	0.030	<0.01	0.030	1.5
PC 35	2 Rts C	0.5	1.0	<0.01	<0.01	<0.01	<1.0
PC 36	3 Rts C	2.0	2.0	0.025	0.01	0.018	0.9
PI 33	1 Rts C	0.5	0.5	0.011	<0.01	0.011	2.2
PI 32	2 Rts C	2.0	2.0	0.055	0.030	0.0425	2.13
PI 31	3 Rts C			0.026	0.034	0.030	1.5
PC 42	1 Rts G			<0.01	<0.01	<0.01	<0.5
PC 37	2 Rts G			0.034	<0.01	0.034	1 70
PC 38	3 Rts G			0.035	<0.01	0.035	1.75
PI 40	1 Rts G			0.028	0.020	0.024	1.2
PI 39	2 Rts G	1.0	1.0	0.017	0.046	0.031	3.1
PI 41	3 Rts G	2.0	2.0	<0.01	<0.01	<0.01	<0.5
PC 57	3 Lic Gy	1.0	1.0	0.170	0.083	0.126	12.6
PC 58	3 Lic Gn			0.071	0.087	0.079	7.9
PC 59	3 Lic O			0.088	0.088	0.088	8.8
PI 60	1 Lic Gn			0.087	0.087	0.087	8.7
PI 61	1 Lic O			0.148	0.106	0.127	12.7
PC 4 (2)	3 Lvs Ast.	2.0	2.0	0.05	0.03	0.04	2.0
PI 46	3 Lvs Ast.	1.0	1.0	0.026	0.045	0.036	3.6
Reagent Blank 9				<0.01			
28							
45							
55							
73							

Main Samples
New Mexico
Four Corners

Element: Selenium — Plants

Sample No.	Location Code	Sample Wt. g (1)	Sample Wt. g (2)	Solution Concentration µg/ml (1)	Solution Concentration µg/ml (2)	Average Sol'n Concentration	Plant Concentration µg/g	
PC 4	1 Lvs A	2.0	2.0	<0.005		<0.005	<0.25	x
PC 5	2 Lvs A				0.014	0.014	0.70	
PC 6	3 Lvs A					<0.005	<0.25	
PI 65	1 Lvs A		---		---			
PI 63	2 Lvs A		2.0					
PI 64	3 Lvs A							
PC 7	1 Lvs C							x
PC 8	2 Lvs C		---		---			
PC 10	3 Lvs C		2.0					x
PI 67	1 Lvs C							
PI 66	2 Lvs C			0.006		0.006	0.30	
PI 68	3 Lvs C			<0.005		<0.005	<0.25	
PC 1	1 Lvs G							
PC 2	2 Lvs G							
PC 3	3 Lvs G							
PI 44	1 Lvs G							
PI 62	2 Lvs G							
PI 43	3 Lvs G							
PC 20	1 Plt L				0.022	0.022	1.10	
PC 22	2 Plt L					<0.005	<0.25	
PC 21	3 Plt L							
PI 71	1 Plt L	1.0	1.0				<0.5	
PI 70	2 Plt L	1.0	1.0					
PI 69	3 Plt L	1.0	1.0					
PC 16	3 Lvs W	2.0	---		---		<0.25	
PI	3 Lvs W	---	---	---	---	---	---	x
PC 17	3 Lvs S	2.0	---	<0.005	---	<0.005	<0.25	
PI 72	3 Lvs S	1.0	1.0				<0.50	
PC 18	3 Plt M	2.0	---		0.055	0.055	2.75	
PI 54	3 Plt M	1.0	1.0	0.007		0.007	0.7	
PC 19	2 Lvs Gs	2.0	---	<0.005	0.055	0.055	2.75	
PI 47	2 Lvs Gs	1.0	1.0			<0.005	<0.5	
PC	1 Bk A	---	---	---	---	---	---	x
PC 14	2 Bk A	2.0	2.0	<0.005	0.008	0.008	0.40	
PC 15	3 Bk A	2.0	---		---	<0.005	<0.25	
PI 52	1 Bk A	1.0	1.0				<0.5	
PI 51	2 Bk A	1.0	1.0					
PI 53	3 Bk A	1.0	1.0	0.044		0.044	4.4	

Main Samples
New Mexico
Four Corners

Element: Selenium

Plant

Sample No.	Location Code	Sample Wt. g (1)	Sample Wt. g (2)	Solution Concentration µg/ml (1)	Solution Concentration µg/ml (2)	Average Sol'n Concentration	Plant Concentration µg/g
PC 11	1 Bk G	2.0	2.0	<0.005		<0.005	<0.25
PC 13	2 Bk G						
PC 12	3 Bk G				0.009	0.009	0.45
PI 49	1 Bk G					<0.005	<0.25
PI 50	2 Bk G						
PI 48	3 Bk G						
PC 27	1 Rts A						
PC 30	2 Rts A						
PC 29	3 Rts A						
PI 26	1 Rts A						
PI 25	2 Rts A						
PI 24	3 Rts A				0.013	0.013	0.66
PC 34	1 Rts C	2.0	1.0			<0.005	<0.5
PC 35	2 Rts C	0.5	1.0				
PC 36	3 Rts C	2.0	2.0				<0.25
PI 33	1 Rts C	0.5	0.5				<1.0
PI 32	2 Rts C	2.0	2.0				<0.25
PI 31	3 Rts C						
PC 42	1 Rts G						
PC 37	2 Rts G						
PC 38	3 Rts G						
PI 40	1 Rts G						
PI 39	2 Rts G	1.0	1.0				<0.5
PI 41	3 Rts G	2.0	2.0				<0.25
PC 57	3 Lic Gy	1.0	1.0				<0.5
PC 58	3 Lic Gn						
PC 59	3 Lic O						
PI 60	1 Lic Gn						
PI 61	1 Lic O						
PC 4 (2)	3 Lvs Ast.	2.0	2.0				<0.25
PI 46	3 Lvs Ast.	1.0	1.0				<0.5
Reagent Blank 9				<0.005			
28				<0.005			
45				<0.005			
55				<0.005			
73				<0.005			